

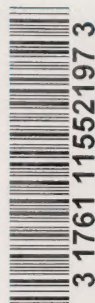


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Toward a Fish Habitat Management Policy

for the
Department of Fisheries and Oceans

DISCUSSION PAPER

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Discussion Paper

TOWARD A FISH HABITAT MANAGEMENT POLICY
FOR THE
DEPARTMENT OF FISHERIES AND OCEANS

August 2, 1983



DEPARTMENT OF FISHERIES AND OCEANS, OTTAWA

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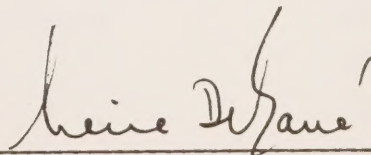
PREFACE

An Open Letter from the Minister

During the relatively short period since my appointment as Minister of Fisheries and Oceans, two important reports on fisheries policy in Canada have been published: one on west coast fisheries policy by Peter Pearse, and the other on Atlantic fisheries by Michael Kirby. The Pearse report points out the importance of preserving and improving fisheries habitat if our natural stocks are to remain healthy. While the Kirby report was not required to deal specifically with fish habitat, a healthy habitat base is essential to the well-being of the Atlantic fishery and the benefits derived from it. As a means of addressing the habitat question, I am now pleased to release a policy discussion paper on the subject of fish habitat management in Canada.

Fish stocks and their habitats are more difficult to protect than other renewable resources - for example, our forests - because aquatic resources are largely hidden from view and the common property nature of the resources and their habitats subjects them to multiple, often conflicting, uses. It is therefore important to establish a dialogue with all interested parties realizing that, in the final analysis, we must all accept a share of the responsibility for meeting our national fish habitat management goals. Accordingly, I am proposing to clarify the department's policy in this area and to strengthen its application.


Since this proposed policy identifies the importance of public consultation, I wish to seek the views of a wide variety of people and organizations on the contents of this document. It is part of a sincere effort to gain wide-ranging insight into the kind of policy that will be equal to the demands of the future. I hope that those interested will take the time to study the document and make their views known either by writing directly to me or at one of the regional meetings to be arranged by the department this Fall.



Honourable Pierre De Bané

Minister of Fisheries and Oceans

July, 1983



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SUMMARY

Canada's fisheries resources are under pressure today from two sources: intensive harvesting and habitat loss. Government has a duty to manage these problems in order to deal with conflict and to control any adverse effects on its citizens - commercial fishermen, recreational fishermen, native peoples and a variety of others who depend in some way on the nation's fisheries resources.

Many people fail to understand that the continued flow of benefits from our fisheries resources depends upon the quality and quantity of natural fish production systems, referred to as habitats. These production systems include not only the water in rivers, lakes, streams and oceans, but also the total physical, chemical and biological surroundings in which plants and other life forms interact to make fish life possible. To use an analogy, managing fish without regard for their habitat would be like farming without concern for soil and water conservation.

This discussion paper proposes a federal policy for fish habitat management, outlines a guide to the application of this policy and highlights some important policy issues in an attempt to stimulate public discussion and generate constructive comment. The paper offers not only a challenge to Canadians to take steps to prevent further damage to the habitats supporting our fisheries and the riches they provide, but it also presents a significant opportunity to make the world a healthier place for fish, and incidentally for other living things.

This opportunity focusses on reversing the damage to certain habitats that has taken place as a result of years and years of neglect and abuse. Habitat restoration projects may be undertaken by reclaiming areas that used to serve as quality fish production units - areas where the water quality may be degraded, the flows may be obstructed, or the shorelines and bottoms may be

clogged with debris. These opportunities may be siezed by groups of interested citizens in many instances simply by getting together, seeking technical guidance and other assistance from government agencies, and undertaking the task.

Regarding the challenge of preventing further damage to habitats, some fisheries are more susceptible than others to the adverse effects of habitat disruption. Because of their particular life history, the salmon and other ocean-going species that spawn in freshwater are particularly vulnerable to habitat disruption. This is also true of those resident freshwater stocks that are found near urban and industrial activity, as well as marine near-shore species such as shellfish and lobster that are unable to quickly re-locate. Certain marine fish and mammals, such as species of herring and whales, are also dependent on shore zone habitats for part of their life cycle. All species of fish, shellfish and marine mammals are, of course, susceptible to the insidious effect of toxic chemicals in their environment.

Outline of the Policy. The department's habitat management policy must be an integral component of fisheries management policies and have sufficient scope and flexibility to allow regional departmental managers to prevent further damage to the habitats of fisheries resources and to achieve their objectives through selective emphasis on the habitat goals and strategies. Accordingly, a comprehensive departmental **objective** has been proposed for fish habitat management, stated as follows:

to conserve, restore and develop fish habitats to maintain
and improve the production of Canada's fisheries resources
for the benefit of present and future generations.

This objective would be supported by three proposed **goals** which are listed below:

- i) prevent damage to fish habitats supporting Canada's fisheries resources.

- ii) restore fish habitats in selected areas where economic or social benefits can be achieved through the fisheries resource.
- iii) develop fish habitats in selected areas where the production of fisheries resources can be improved for the social and economic benefit of Canadians.

In working toward the first goal, the department would seek to conserve fisheries resources by protecting habitats from further degradation and maintaining them for future generations. This would be accomplished in a manner that (a) recognizes the legitimate interests of other levels of government and private sector interests, (b) provides opportunities for public views and concerns to be heard, and (c) makes full use of the results of scientific research in reaching habitat protection decisions.

The department's second and third goals would be to restore habitats that have suffered past damage and to improve the natural productive capacity of other habitats for future gains to fisheries resources. These two goals are designed to (a) increase socio-economic benefits from certain fisheries resources, (b) encourage community involvement and the creation of local employment opportunities, and (c) apply new knowledge flowing from scientific and technical studies.

The discussion paper also proposes a series of seven **strategies** and sets out a guide to their application. Important highlights of these strategies are summarized below.

Guiding Principles for Habitat Protection. The paper outlines the department's proposed working principle with respect to private sector developments and public works and activities, of striving for NO NET LOSS of the productive capacity of fish habitats that support the nation's commercial, recreational or native fisheries.

Habitat protection would be pursued on a site-specific basis in support of the department's fisheries management objectives. In-kind compensation to replace or improve fish habitats would be subject to negotiation with proponents, but financial compensation for habitat damage would not be considered acceptable. Furthermore, in its efforts to sustain viable fish harvesting operations, the department would generally encourage natural over artificial fish production, recognizing that aquaculture would continue to play a role in certain circumstances. Proponents of new developments would be responsible for the costs of undertaking fish habitat impact assessment studies related to their projects, of mitigating any likely damages, and of implementing in-kind compensation measures. Certain works or undertakings may be totally prohibited if they are likely to cause permanent damage to the fisheries resources. Management decisions to protect habitats would be based on information and technology provided by the department's scientific research program.

Public Consultation, Awareness and Involvement. The paper identifies a proposed departmental strategy to consult with the interested and concerned public on major or controversial fish habitat issues and the development of new policies and legislation for fish habitat management. This strategy would apply in particular to those projects that involve complex judgments about risk, alternatives, social and economic benefits and costs, and compensatory actions. The department would also promote public awareness and encourage community involvement in the field of fish habitat management. Strong public sentiment in support of habitats would reduce the likelihood that future habitat abuse will occur.

Cooperative Planning and Research. The discussion paper proposes a cooperative resource planning strategy as a means of incorporating fish habitat priorities into the air, land and water use plans of other jurisdictions. This strategy would enable fisheries habitat managers to identify at an early stage in planning those fish habitat values that require protection, along with those areas offering habitat restoration and development opportunities. The

department proposes to designate areas for planning and control purposes to be called "fish habitat management areas." The paper also identifies the need to improve private sector participation with the department for the purpose of undertaking cooperative research studies and other activities.

Restoration and Development Opportunities. The paper proposes that the department adopt positive strategies to restore and develop habitats in order to take advantage of government's desire to create jobs in local areas where unemployment is high, while at the same time augmenting supplies of fish to be harvested by Canadians. Such strategies would encourage closer cooperation with other levels of government and certain industries that have high demands for water in efforts to reach agreement on pollution control approaches and to develop clean-up plans. These strategies would also help to foster improved relations with citizens' conservation groups.

Finally, the paper highlights several additional habitat management policy issues for discussion including (a) mechanisms for increasing private sector participation and (b) the notion of establishing fish habitat conservation sanctuaries.

Many aspects of fish habitat management policy outlined in this discussion paper are currently being practised to some degree by the department in parts of Canada. Interested persons, groups and institutions outside the department are invited to comment on the proposed policy and suggest revisions before it is recommended for final approval and publication by the Minister of Fisheries and Oceans.

I think this country now has the foresight and the ability to prevent further losses in critical habitat areas. Indeed, fish habitat conservation, restoration and development are goals that must be pursued if we want Canada's fishery to thrive.

(St. John's, Newfoundland - May, 1983)

- Pierre De Bané
Minister of Fisheries
and Oceans

CHAPTER ONE

INTRODUCTION

In many parts of Canada, fish stocks have disappeared or are under pressure as the result of two factors: we have generally overfished them and we have often let their habitats be changed or damaged. The threats come from different directions, sometimes having a double-barrelled effect on our fisheries, and the result is always the same: fewer fish. But when habitat is damaged, we lose more than the fish themselves and the industries they support - we also lose our clean waters, shaded streams and natural shorelines. Some might say we lose part of our heritage, knowing that the fish may never return and that we have somehow failed to safeguard the resource in trust for our children's children.

This discussion paper is about fish habitats and the federal program to protect, restore and develop them. It is about those intricate aquatic ecosystems which provide a healthy place to live and grow for our lobsters, salmon, walleye, cod, whales and hundreds of other species. These habitats are the cornerstone of Canada's varied and important fisheries and of the wealth and social benefits they provide. If they are not functioning well, our fish stocks start to change and disappear. In the words of the former Minister of Fisheries and Oceans, Roméo LeBlanc, "the catch starts here".

1.1 The Problem

It is difficult to visualize any fish and its habitat as isolated elements of our total environment. The poorly planned logging that may wreck habitats for freshwater fish and salmon can also change water levels and produce floods downstream. Similarly, carelessness with foreshores and estuaries can have spin-off effects on birds and mammals as well as fish. In fact, fish often serve as a kind of early warning system that measures the health of our larger ecosystem, not unlike the role played by the miner's canary. Consider, for example, the havoc caused by dioxins, insecticides, and other phantom chemicals on animal life in general. The damage we do by pesticide spraying or by the

uncontrolled dumping of chemicals can have a boomerang effect when other predators in the food chain, such as birds and mammals, including man himself, are affected by the consumption of a fisherman's catch. And the damage man starts can spread without his help. Scientists have found traces of PCB's in animal life in the Arctic, where industrial activity is only just beginning.

Looking more closely at the problem, it is easy to cite examples of how Canada's fisheries have suffered as a result of habitat change:

- In the Great Lakes, Atlantic salmon have vanished completely, victims of 19th century industrialization.
- A logging dam across the mouth of the Point Wolf River, New Brunswick, over a century ago, prevented salmon from reaching their spawning and rearing habitat, thereby causing the stock from that river to collapse.
- Gravel mining and urban developments have reduced runs of Pacific salmon in a number of streams in the lower mainland portion of British Columbia.
- Acid rain has wiped out the runs of Atlantic salmon in several Nova Scotia streams.
- Commercial fishing for cod and herring had to be curtailed in an area of Newfoundland in 1969 following the discharge of elemental phosphorus from a chemical plant.
- In Nova Scotia and New Brunswick, restrictions had to be placed on lobster fishing in two areas as a result of chemical discharges.
- High mercury levels in fish in certain inland waters and parts of the Great Lakes have caused areas to be closed to commercial and native food fishermen.

- On both the Atlantic and Pacific coasts, shellfish harvesting along hundreds of miles of shoreline has had to be prohibited as the result of contamination by domestic sewage.

A summary of common problems related to fish habitat is provided in Table 1. Much of the damage occurs close to where we all live and work. We have suffered these losses partly because of industrialization. But more to the point, we have suffered them because the critical link between fish habitat and fish was not recognized - or it was realized too late.

But while it is true that the nation's fisheries resources have been damaged in some areas, it is also true that the patient is far from dead - many of the wounds can be healed and the damages reversed. Moribund fisheries can be revitalized by taking steps to restore the productive capacity of habitats. Acid rain can be controlled, sources of water pollution can be abated, physical damage can be cleaned up and derelict dams can be removed. Planning and undertaking such restoration activities present both a challenge and an opportunity to Canadians as we approach the twenty-first century.

To provide a general framework for this discussion, the primary system of fisheries production is illustrated in Figure 1. The upper arrow represents the production of Canada's commercial, recreational and subsistence fisheries in the form of food, and of economic and social benefits. This production is dependent on the base of fish habitat. Through habitat restoration and development activities, this base can be increased. However, neither activity can totally replace what has been historically lost. Further loss must be prevented to maintain the essential habitat base.

1.2 The Economics of Habitat Management

Fish are an important part of Canada's renewable resource base. Commercial and recreational fisheries contribute more than \$3 billion annually to the national economy in 1982 dollars. Fish and their habitats are a valuable tourist attraction, generating local income quite apart from fishing

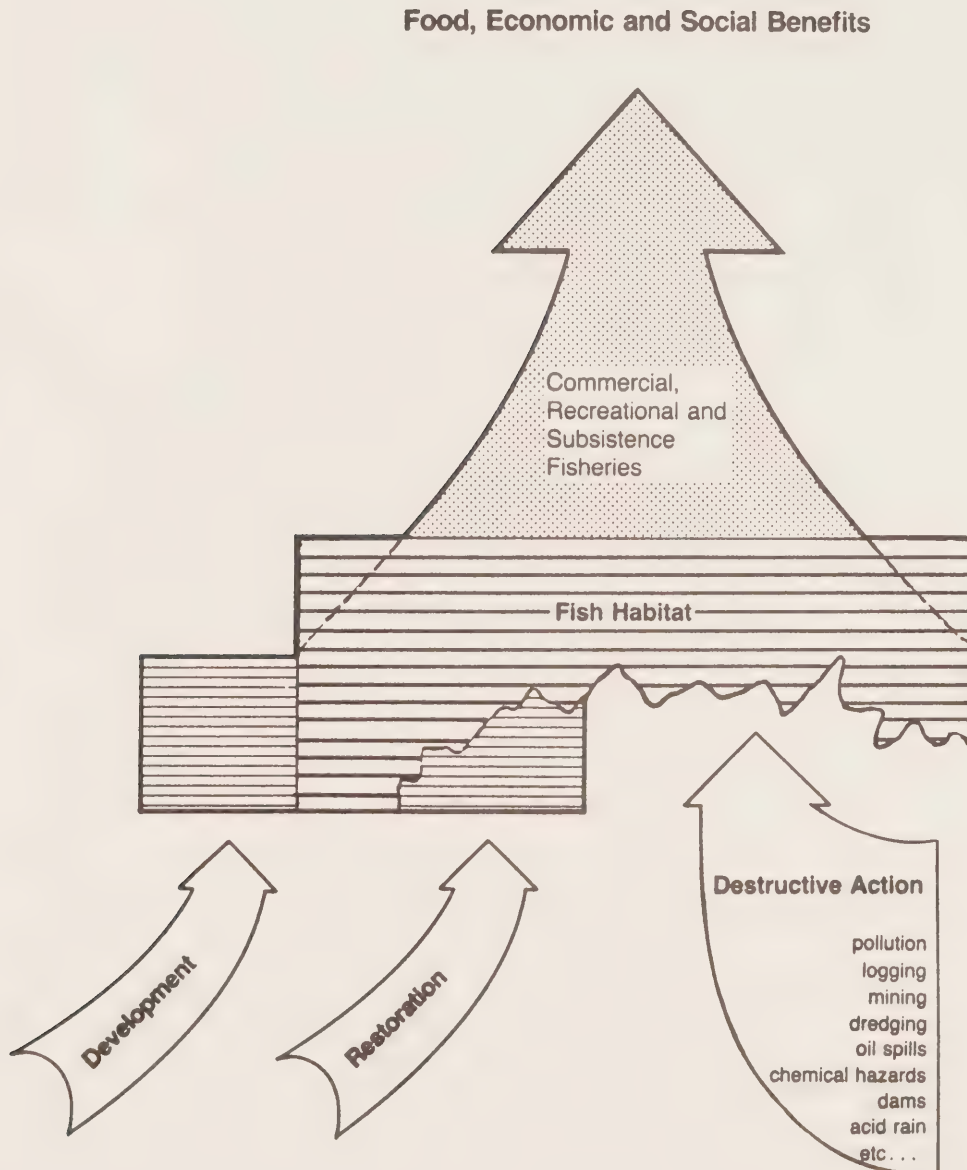
TABLE 1

SUMMARY OF FISH HABITAT PROBLEMS

Agent	Work or Undertaking	Effects on Fish and Habitat
1. Physical	Dams and diversions	- interference with migration; loss of river habitat; and altered water flows.
	Wetland drainage and land-filling	- loss of resting, rearing and spawning areas; and loss of food and nutrient supplies.
	Dredging and construction	- siltation or loss of habitat; and disturbance of rearing and migration areas.
	Logging and log storage	- siltation of habitat; altered food supplies; altered spawning and rearing areas; increased temperature; altered river flows; and some oxygen depletion.
	Offshore oil and gas	- disturbance of bottom habitat.
	Water intakes	- entrainment and impingement.
	Heated water discharges	- local habitat alteration.
	Gravel removal from streams	- siltation of habitat; and loss of spawning and rearing habitat.
	Mining operations	- siltation of habitat.
2. Chemical	Toxic wastes and chemicals (air, land and water sources)	- loss or impairment of fish; reduction of food supplies; tainting of fish flesh; and obstruction to migration.
	Organic wastes	- oxygen depletion; altered food supplies; and smothered bottom habitat.
	Radioactive wastes	- altered reproductive potential.
	Acid rain	- widespread habitat disruption.
3. Biological	Canal construction and river diversion	- introduction of disease organisms, parasites and exotic species.
	Municipal sewage discharge	- bacterial contamination of shellfish.

Figure 1

THE PRIMARY SYSTEM OF FISHERIES PRODUCTION



activities. In addition, there are other less tangible social benefits which flow from the fishery resource, such as support for traditional lifestyles in small, remote communities, and, to the urban dweller, the simple knowledge that the fish are there, even if he or she does not use them. With wise management, this resource will continue to provide benefits to the nation in perpetuity.

What is often overlooked by Canadians is that, in order to ensure the continued flow of benefits from the fishery, it is critical that the quality natural systems that produce fish be protected from harm. These systems include not only the water in rivers, lakes, streams and oceans, but also the total surroundings in which plants and other life forms interact to make fish life possible. To use an analogy, managing fish without regard for their habitat would be like farming without concern for soil and water conservation. If habitat goes, so do the fish.

Generally, it is more cost-effective for a fisheries management agency to ensure that fish are produced naturally, rather than in hatcheries. One need only consider the high costs of constructing and operating a fish hatchery facility in perpetuity, compared to the relatively modest costs of supporting a habitat management program. The artificial production of fish will continue to play an important role in enhancing certain fisheries, but it should not be used to replace the productive capacity of natural habitat except in certain circumstances. To quote the late author and conservationist, Roderick Haig-Brown: "Hatcheries do not and cannot replace the productive yield of natural stocks. Their value is in special uses."

1.3 National and International Considerations

The fish habitat management program serves the objectives of more than just the federal fisheries program. The habitat management program also helps to meet a broader national objective (Environment Canada) to "preserve and enhance the quality of the environment for the benefit of present and future generations of Canadians". The department's habitat management activities will

also help to fulfill Canada's commitment to the United Nations' World Conservation Strategy, part of which calls for the maintenance of the support systems for fisheries and for the control of pollution.

In accord with this philosophy, Canada pressed for a strong Law of the Sea, in order for this country to be better able to deal with marine pollution issues. The length of Canada's coastline, the vulnerability to environmental degradation of large coastal areas having Arctic characteristics, combined with the importance of the coastal environment for fisheries production, dictated a major Canadian interest in the preservation of a quality ocean environment. The habitat protection provisions of the Fisheries Act are applicable throughout the 200-mile offshore fisheries zone, enabling the department to control marine pollution and to take remedial action, if fisheries resources are affected. In 1970, prior to the declaration of the 200-mile limit, Parliament recognized the special sensitivities of Arctic marine waters by passing the Arctic Waters Pollution Prevention Act, a move that was supported by fisheries interests.

The department will continue to address concerns for fish habitat management in international fora whose mandates affect fish habitat objectives. The International Joint Commission and the Great Lakes Fishery Commission will be supported in addressing bilateral issues, such as the Garrison Diversion project, the restoration of salmon on the St. Croix River, and the clean-up of the Great Lakes. The department will continue to cooperate with the International Maritime Organization (IMO) to regulate the transport of hazardous wastes at sea, and with both the Organization for Economic Cooperation and Development (OECD) and the International Council for the Exploration of the Sea (ICES) in their efforts to coordinate international research and monitoring programs.

1.4 Federal-Provincial Considerations

The Constitution Act (1982) assigns legislative responsibility for Canada's fisheries to the federal government. The habitat protection powers of the federal government are contained in the Fisheries Act, assigned to the Minister of Fisheries and Oceans by Parliament. These provisions are summarized

in Appendix 1. Under this Act, the Minister is authorized to regulate activities that will disrupt or degrade the habitat of fish, and is accountable to Parliament to ensure that this responsibility is met.

Through formal agreements negotiated between 1899 and 1930, the federal government has withdrawn from day-to-day management of all fisheries in the provinces of Ontario, Manitoba, Saskatchewan and Alberta, and some fisheries in the provinces of Quebec (where the province manages freshwater and salmon fisheries), and British Columbia (where the province manages freshwater species, excepting salmon). In these six provinces (or areas thereof), federal fisheries legislation is administered by the provincial fisheries management agency. In 1982 an administrative agreement was signed between Canada and Nova Scotia, whereby the province would be responsible for the management of trout fisheries.

Managers of these agencies would be encouraged to make use of this policy, once it is approved. Federal authorities may assist their counterparts in these provinces in cases involving discretionary sections of the Act which cannot legally be delegated. In many of these jurisdictions, the federal government has approved provincial fisheries regulations which identify the provincial Minister responsible for fisheries as the management authority. In addition, provincial conservation officers are often designated as Fishery Officers for purposes of administering the Act.

Many activities administered by the provinces and territories, such as logging, road construction, water and land management, and agricultural and urban development, can have negative effects on fish and their habitat if the developments are not properly planned and managed. In areas where the federal government administers the fish habitat provisions, the department will participate with the provinces and territories in reviewing plans for such activities to resolve resource conflicts involving fish habitat. In areas where the federal government is not directly responsible for fish habitat administration, the department is prepared to provide advice to the provinces.

Provincial agencies also have a legislative responsibility for water pollution control which can be complementary to federal efforts to protect fish and fish habitat from the effects of pollution. Accordingly, both the department and Environment Canada coordinate their activities with those of the provinces. Most provinces serve as the lead for liaison with industrial proponents. In areas where the federal government manages the fisheries, the department provides the specifications for protection of the fisheries resource and the provincial agency ensures that these requirements are met. Where this fails to occur, the Department of Fisheries and Oceans and Environment Canada deal directly with proponents to ensure that federal objectives are met.

1.5 Application

Direct federal authority for fisheries management and habitat protection extends to the Atlantic provinces of Newfoundland, New Brunswick and Prince Edward Island, the anadromous salmon and marine fisheries of British Columbia and Nova Scotia, the marine fisheries of Quebec, and the fisheries of the Yukon and Northwest Territories. The proposed policy would apply directly in those areas.

In those other provinces or parts thereof referred to earlier, where the federal government has withdrawn from day-to-day fisheries management, the federal department would be guided by the policy in carrying out those responsibilities which fall to the federal government as a consequence of federal-provincial agreements or international considerations.

The federal government, through the Department of Fisheries and Oceans, is prepared to take action against those who abuse fish habitat. Indeed, the department has had a cadre of habitat specialists operating for many years on the east and west coasts, on the Great Lakes, and in Canada's North. Unfortunately, there has never been a clear statement of habitat policy to guide those who work within the program.

1.6 The Need for a Policy

In the final report of the recent Commission on Pacific Fisheries Policy, Dr. Peter Pearse concluded that, in order to protect the environment supporting Pacific fisheries, "we will need a strong and comprehensive habitat management policy". Just prior to Dr. Pearse's work, a Fish Habitat Management Revitalization Task Force in the department's Pacific Region also identified the need for a departmental policy on habitat management. In the department's three Atlantic Fisheries Regions, a similar need has been identified by an internal Fish Habitat Management Task Group. In addition to providing guidance to the department, these conclusions also are indicative of a broad interest by such industries as mining, forestry, electric power, and others, as well as by conservation groups and fishermen, in national fish habitat management policy.

The purpose of this paper is to lay out the proposed principles, objectives and strategies which the Department of Fisheries and Oceans will apply in managing fish habitat (Figure 2). Many aspects of the fish habitat management policy outlined in this paper are currently being practised to some extent by the department in parts of Canada. Interested parties outside the department are invited to comment on the proposed policy and suggest improvements before it is finally recommended for official approval and publication by the Minister of Fisheries and Oceans.

Figure 2

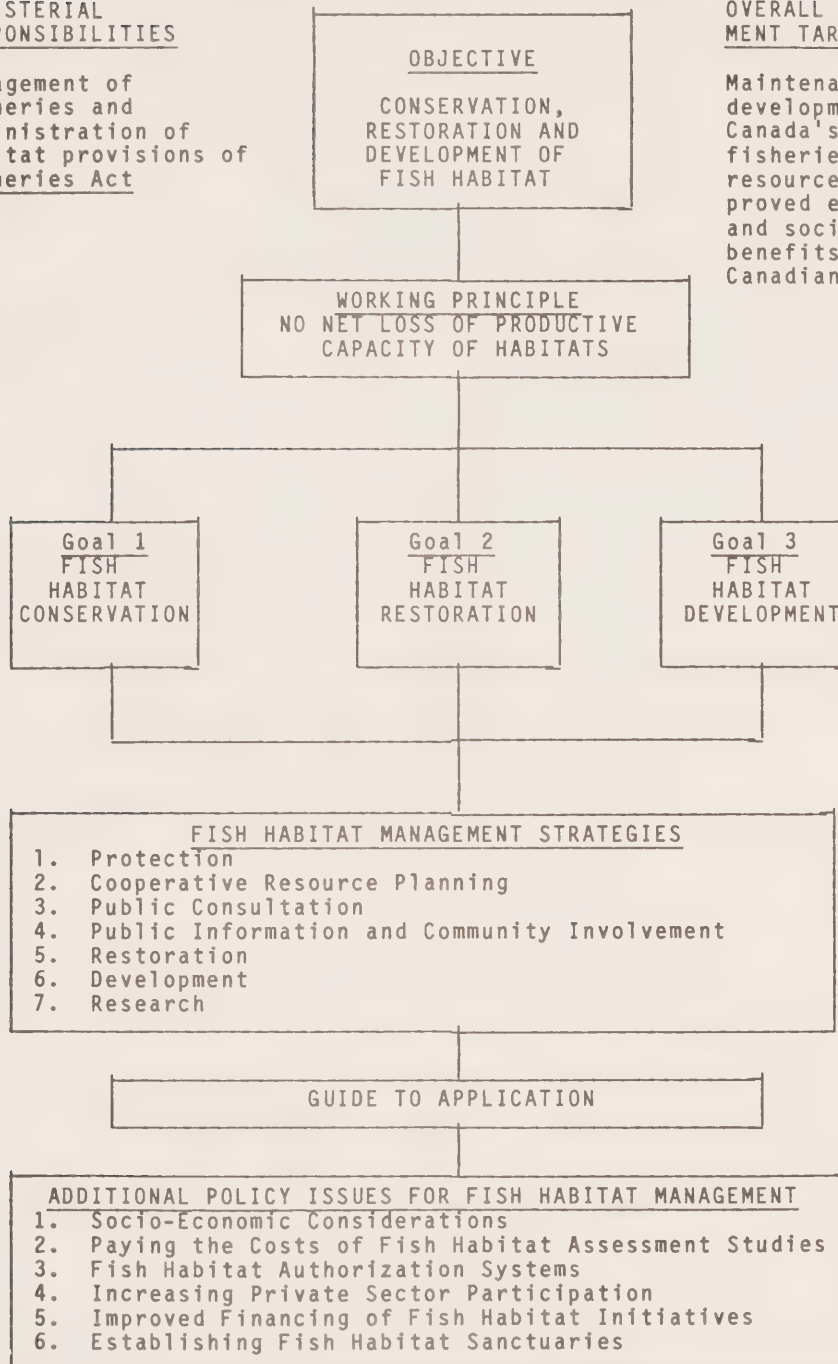
POLICY CHART FOR FISH HABITAT MANAGEMENT

MINISTERIAL RESPONSIBILITIES

Management of fisheries and administration of habitat provisions of Fisheries Act

OVERALL GOVERNMENT TARGETS

Maintenance and development of Canada's fisheries resource and improved economic and social benefits to Canadians



The specific role of the Department of Fisheries and Oceans should be to ensure that the productive capacity of natural fish habitat is protected against damage from industrial activities.

(Vancouver, B.C. - September, 1982)

- Dr. Peter Pearse
Commissioner
Pacific Fisheries Policy

CHAPTER TWO THE POLICY

2.1 General Principles

The Department of Fisheries and Oceans is classed as an economic development department within the federal government's "envelope" system for policy approval, expenditure management and decision-making. Accordingly, the habitat management program of the department is required to support government economic development initiatives through the direct linkage of Canada's fisheries with the habitat which sustains and supports them. All fish species depend directly on the integrity of the ecosystem within which they exist and it is therefore an economic and social necessity to ensure the conservation of these ecosystems - the habitats of fish.

Within the department, the habitat program began to shift in recent years from one aimed strictly at preventing damage to fish habitats, including water quality, to one which includes cooperative planning with other resource agencies and users, and the restoration and development of habitats. The potential for increasing benefits from fisheries resources through selective investment in the restoration and development of fish habitats is an economic opportunity that to date has not been fully exploited by Canadians. Improved benefits from wise management of fish habitat can be achieved through cooperation from an interested public and private sector, and through a department whose performance can be measured against clear policy goals and expected program results.

The following principles are proposed as a guide to the department in its actions in the habitat field and would serve to accomplish the proposed policy objective and goals described in this document:

1. Fish habitat management strategies should be pursued on a site-specific basis, recognizing the importance of optimizing fish

production within ecological systems, and in support of the department's fisheries management objective.

2. Damage to fish habitat, including the quality of water, that is likely to reduce permanently the productivity of fisheries resources or impair the marketability of fish should be considered unacceptable.
3. The manufacture, distribution and use of highly toxic, persistent chemicals that tend to accumulate in tissues of aquatic organisms, thereby causing direct harm to fish or rendering them unfit for human consumption should be opposed.
4. Physical obstructions on the main stems of major salmon-producing rivers such as the Fraser, Skeena, Restigouche or Miramichi should be opposed.
5. Within the context of maintaining traditional harvesting operations for Canada's fisheries resources, natural production should generally be encouraged over artificial production as the most economically efficient means of producing fish in perpetuity and of maintaining genetic diversity and the strength of fish stocks.
6. Discretionary decisions to prevent habitat damage using the habitat protection provisions of the Fisheries Act should be taken on the Minister's behalf by personnel trained in habitat management and operating within their own areas of expertise.
7. In the case of site-specific developments, after mitigation options have been exhausted, the use of habitat replacement and fish production compensation to overcome predicted losses should be considered acceptable. Cash should not be considered as an acceptable form of compensation for damage to fish stocks.

8. The costs of undertaking any necessary fish habitat assessment studies to determine the possible impacts of particular developments should be borne by the proponent. Further, the proponent should be responsible for mitigating anticipated damages and for implementing compensation measures to avoid losses of fish habitat and reductions in the supply of fish.
9. Some form of organized public consultation is seen as important before final decisions are taken on major or controversial projects that threaten fisheries resources.

2.1.1 Assigning Priorities for Action

Fish habitat managers frequently face questions of choice in addressing problems and managing conflict within their areas of responsibility. The department is not equipped to, nor does its policy propose to conserve, restore and develop all fish habitat in Canada. Managers therefore use their best judgement as to the importance of particular areas of habitat and the priority to be given to issues, taking into account the following factors:

- (a) the size, economic value and social importance (actual or potential) of the fisheries resources likely to be affected by change;
- (b) the likelihood of exposure of fish or fish habitat to a hazard;
- (c) the probability of damage to fisheries resources;
- (d) the degree of public concern over the issue,
- (e) the question of agency mandate and jurisdiction; and
- (f) the technical and administrative feasibility of assessing the problem and of taking preventative or remedial action.

2.2 Policy Objective

FISH HABITAT CONSERVATION, RESTORATION AND DEVELOPMENT

Conserve, restore and develop fish habitats to maintain and improve the production of Canada's fisheries resources for the benefit of present and future generations.

The results of scientific research indicate clearly that fish depend on the many components of their habitat for growth, reproduction and completion of their life cycles. The conservation, restoration and development of fish habitats are therefore essential to and an integral part of the federal program of managing fisheries in support of Canada's economic and social aspirations.

Investment to meet this proposed objective in selected areas would increase local income and employment, enhance regional development and safeguard the interests of native peoples. This objective would apply to all Canadian waters where the federal government manages the fisheries resources. The department would accomplish this objective and the three goals which are explained later, in accordance with a series of principles, including the working principle of NO NET LOSS, and by means of a series of seven strategies.

2.2.1 The Working Principle of No Net Loss

The department should strive to achieve NO NET LOSS of the productive capacity of those habitats that support Canada's fisheries resources.

The proposed fish habitat policy objective can be met by pursuing goals to conserve, restore and develop Canada's fisheries resource through wise management of the habitat base which supports it. NO NET LOSS should be adopted by the department as a working principle through which to achieve the proposed policy objective and three supporting goals.

This proposed principle could be used immediately to deal with site-specific proposals. Eventually, as habitat inventories are improved to provide a more reliable data base, the principle could be extended to river basins and fish habitat management areas designated by the department.

Any damage to fish habitat that is likely to permanently reduce the productivity of fisheries resources should be considered unacceptable by the department. Damage to Canada's fisheries resources can often be avoided by (a) mitigating potential problems through design, construction and operational adjustments, (b) encouraging alternative site selection, (c) restoring the quality of damaged habitats, (d) compensating for unavoidable losses by employing habitat replacement and development techniques, and (e) prohibiting certain proposed activities that could severely damage fish habitats. In this way, NO NET LOSS could be achieved.

The department recognizes that NO NET LOSS would not be a simple principle to apply. The operational approach, described in more detail in the Protection Strategy (Chapter 3), would thus be kept under active review, and as experience dictates the need for change, adjustments would be made.

2.2.2 Generating Economic and Social Benefits

The proposed fish habitat objective also offers a significant challenge to Canadians whereby fish habitat restoration and development opportunities may be identified and pursued to improve the nation's fisheries. Initially, additional research and inventory studies would assist in successfully meeting this challenge, and if aggressively pursued by the department in cooperation with other interested parties, gains could be made in fish production through improvements in the productive capacity of natural habitat. Benefits would subsequently flow to the fisheries through improved catches and to local economies through higher earnings and more stable employment. Secondary industries generating income from improved recreational and commercial fisheries would also benefit from the implementation of this policy. In addition, habitat restoration and development projects would generate purchases of goods and services and stimulate local employment during the construction and operation phases.

2.3 The Three Goals

2.3.1 First Goal

FISH HABITAT CONSERVATION

**Prevent damage to fish habitats supporting
Canada's fisheries resources.**

SUPPORTING STATEMENT

The policy proposes a commitment to the conservation of habitats that sustain, or have the potential to sustain, stocks of fish supporting Canada's commercial, recreational or native food fisheries. It is recognized however, that other resource exploitation activities, industrial developments and urban expansion will proceed in association with the economic growth of Canada. Accordingly, decisions on the level of protection afforded to specific fish habitats should be based upon their actual or potential importance in sustaining Canada's fisheries resources.

In the majority of cases, there should be no dispute as to those fisheries resources of importance to Canadians. On some occasions, however, developments may threaten habitats that are not easily recognized as being vital to economically or socially important fish, shellfish or marine mammals. These instances, often involving more subtle ecological or social considerations, such as the protection of the habitat of whales or of the un-fished Arctic cod (an essential link in the arctic food chain), should also be considered important by the department. In addition, the department recognizes that biological changes such as the introduction, through water course alterations, of exotic species (for example, lampreys in the Great Lakes), parasites and disease, can have serious repercussions on the habitat sustaining important fisheries.

Simply stated, the intent of the habitat conservation goal is to maintain the overall productive capacity of fish habitat. Every effort would be made to prevent habitat damage that is likely to result in losses to the fisheries resource.

2.3.2 Second Goal

FISH HABITAT RESTORATION

Restore fish habitats in selected areas where economic or social benefits can be achieved through the fisheries resource.

SUPPORTING STATEMENT

Restoration of fish habitat would complement the preventive approach detailed in the first goal. Losses of fish production and contamination of fish flesh through habitat degradation have been caused by the release of harmful contaminants, by the discharge of municipal and industrial wastes, and by the physical alteration of spawning, rearing and migration areas. The restoration of the biological and chemical quality of water and repair of physically disrupted habitats have often been achieved by enforcing pollution control laws, by application of suitable waste treatment technology, by eradicating foreign predators and parasites, by removal of man-made physical barriers, and by other measures to restore the fish habitat and thus fisheries production. Habitat restoration projects should form part of integrated fisheries management programs which result in the rehabilitation of socially or economically valuable fisheries.

2.3.3 Third Goal

FISH HABITAT DEVELOPMENT

Develop fish habitats in selected areas where the production of fisheries resources can be improved for the social and economic benefit of Canadians.

SUPPORTING STATEMENT

In many fisheries waters the production of fish is limited by insufficient nutrients, natural barriers to fish movement, or an imbalance in the habitat constituents needed to increase natural production. By manipulating these various habitat factors, or providing fish passage, fish production can be improved.

The pursuit of this proposed goal would provide the department with an opportunity to apply the results of its research program, and to improve social and economic conditions in selected areas through the investment of funds in habitat development projects, in conjunction with other government agencies and the private sector. Such projects would provide both short and long term employment and economic development opportunities that can be achieved through improved commercial and recreational fisheries. Later sections of this paper elaborate both restoration and development prospects.

2.4 The Seven Strategies

To achieve the proposed objective and goals described above, seven proposed strategies are described below. These are intended to reflect current practices of the department in managing habitat issues, revealing an emphasis on prior assessment, planning and control, remedial measures and scientific research. Satisfactory implementation of those strategies related to habitat restoration and development would be dependent on the availability of departmental resources and the degree of cooperation received from other sectors and levels of government. The seven proposed strategies would contribute to improved economic and social values for Canadians through benefits derived from the fisheries resource.

2.4.1 First Strategy

HABITAT PROTECTION

Protect fish and fish habitat by enforcing the Fisheries Act and incorporating fish habitat protection requirements into land and water use activities and projects, and new federal legislation.

SUPPORTING STATEMENT

Physical Hazards. There is a multitude of activities and developments which, if not properly planned, could have significant adverse effects on fish and their habitats. Dams and diversions which block or re-route rivers and lakes can prevent fish movements and alter temperature, food supply, water flow and the delicate chemical balance, each of which forms part of the habitat needed by fish. Shoreline construction of breakwaters, piers and other structures can destroy important fish rearing areas, and block the transport of nutrients and food, thus disrupting habitats remote from the point of impact. Dredging may destroy fish spawning beds or contaminate them with silt. The same is true of highway, railroad and pipeline construction. Finally, poorly planned forest harvesting operations can cause serious siltation, alter temperature, flow and food supply, and overload streams with organic debris.

The department should continue to carry out its mandate by ensuring a uniform and equitable level of compliance with statutes, regulations and policies necessary to manage and protect fish and fish habitat. The department should also continue to deal directly with physical impacts on habitat by using the habitat protection provisions of the Fisheries Act. Finally, when voluntary compliance fails to produce the desired objective of conserving the productive capacity of habitats, the department should continue to rely on statutory controls. Adverse effects on fish habitat can frequently be avoided by modification of the proponent's plans.

Chemical Hazards. The disposal of liquid wastes or the accidental release of toxic chemicals into aquatic environments can kill or impair fish and the food organisms upon which fish depend, and can degrade their habitat. The accumulation of persistent chemicals by fish can also reduce reproductive success or cause the flesh to be unsafe for human consumption. Nutrient-laden municipal and agricultural wastes can cause over-enrichment of water bodies and result in the loss of desirable species such as salmon and trout. Other wastes can taint the flesh of fish, or cause shifts in migration routes as fish avoid the contaminated areas. Chemical hazards can ruin fish habitats without much visible evidence, until dead or inedible fish start appearing.

Because of these effects, the Fisheries Act contains strong and specific authority under section 33 to prevent the deposit into fish-bearing waters of substances and wastes deleterious to fish. The protection of fish from the effects of water pollution has been a responsibility of the Minister for Fisheries since Confederation, and while he is accountable to Parliament for the Act, the responsibility for administration of section 33 is currently shared with the Environmental Protection Service (EPS) of Environment Canada, under an interim arrangement dating from the establishment of separate departments of Fisheries and Oceans and Environment in 1979. Negotiations commenced in 1983 between the two departments regarding the future administrative responsibility for section 33.

The department should also continue to provide advice and specific fisheries requirements to other federal agencies in an effort to control the potentially adverse effects on fisheries of non-point sources of chemical pollutants such as acid rain, pesticides and other environmental contaminants.

2.4.2 Second Strategy

COOPERATIVE RESOURCE PLANNING

Encourage and participate in cooperative resource planning to incorporate fish habitat priorities into air, land and water use plans.

SUPPORTING STATEMENT

Competing demands for the use of common property natural resources are rising rapidly. Water, the essential habitat medium for fisheries, is in demand for recreation, human consumption, waste disposal, industrial processing, forestry, mining, power generation, agriculture, transportation and other uses. Logging operations, mining activities, offshore developments, and other undertakings can result in habitat disruption and subsequent losses to the fisheries. Use of aquatic resources for such purposes, without considering side effects on other current and potential uses, can prevent the full realization of the fisheries potential.

The department should be prepared to implement its fish habitat conservation responsibility in a way that recognizes the value of cooperative resource planning and management with other agencies and resource users. Such a strategy is being practised now by the department in some areas. It enables regional fisheries habitat managers to identify at an early stage those fish habitat values that require conservation, together with those areas offering habitat restoration and development opportunities. This would allow the department to move away somewhat from a strictly reactive habitat protection stance. Habitat managers would apply their specialist knowledge in a manner that anticipates disruptive activities, provides advice to developers and other resource industries, and assists municipal and regional planning.

Within the context of cooperative resource planning, the department should emphasize the positive values associated with fisheries, such as recreation, urban improvement, commercial fishing, fish processing, subsistence or traditional use by native peoples, tourism and marina development.

2.4.3 Third Strategy

PUBLIC CONSULTATION

Consult the public on major or controversial fish habitat issues and on the development of new policies and legislation for fish habitat management.

SUPPORTING STATEMENT

Silence gives consent

- Oliver Goldsmith

Achievement of the habitat management policy objective involves the review of myriad development proposals and other activities - ranging in complexity from industrial mega-projects down to small stream crossings - to assess their impact on the fisheries resource. For the majority of these projects, fisheries protection needs are incorporated and the requirements of the Fisheries Act are accommodated without confrontation or controversy. For such non-controversial projects, full public consultation should not be necessary.

Certain projects, however, involve complex judgments about risk, alternatives, social and economic benefits and costs, and compensatory actions. Because of the widespread potential impact of new federal policies and legislation, interested parties ought to have an opportunity to express their views and receive explanations. A public consultation process would assist both the department and the Minister in formulating judgments and would contribute to a greater public understanding of decisions finally taken.

Interested public groups and concerned citizens should be given an opportunity to openly express their views and to consult with government on the implications of such developments to Canada's fisheries resources. The department and the Minister would be prepared to consider all views expressed in arriving at the optimum solution, consistent with the responsibilities of government.

2.4.4 Fourth Strategy

PUBLIC INFORMATION AND COMMUNITY INVOLVEMENT

Promote public awareness and encourage community involvement in the conservation, restoration and development of fish habitats.

SUPPORTING STATEMENT

For policy to be fully effective, widespread public interest and understanding is a must.

- Roméo LeBlanc

Public participation and support are important to the success of any renewable resource management operation. Public concern for environmental values, including fish habitat, indicates a large base of active and latent support. Industries and resource agencies are, as well, demanding information and clear statements on fish habitat requirements.

The department should foster increased public awareness of the importance of fish habitat and the threats to it. The considerable public interest and involvement in the department's salmon management and development programs on both coasts have shown that the public not only has a desire to be aware but also a willingness to participate actively in the restoration and development of fish habitat.

On a more fundamental level, strong public sentiment in support of habitat conservation, restoration and development would also reduce the likelihood that habitat abuse will occur.

2.4.5 Fifth Strategy

HABITAT RESTORATION

Restore the productive capacity of degraded habitats through either direct government action or cooperation with others.

SUPPORTING STATEMENT

Restoration is an action taken to repair damage to fish habitat that occurred in the past or is continuing to occur. In the past, physical damage to habitat often occurred through inattention or lack of understanding. This damage may have taken the form of the removal of forest cover, dams obstructing fish passage, gravel removal operations destroying spawning areas or any other of the many physical actions that can harm fish habitat. Restoration can often be as simple as the provision of fish passage, the implementation of a schedule of minimum flows, a stream or shoreline clean-up operation, or a tree planting program along the banks of a river.

Chemical damage to Canada's inland fisheries has been extensive and programs are being undertaken to restore some of those affected. Not only have discharges from industrial processes and mineral developments affected survival of fish but contamination of fish flesh has caused market disruption and loss of revenues. Waste treatment facilities have been installed by many industrial plants, and lime treatments have been applied experimentally to lakes and rivers damaged by acid rain.

Biological restoration of a damaged area is an activity that is in its infancy at this time. Specific examples include replanting eel grass beds that were destroyed by log storage and controlling the sea lamprey in the Great Lakes. The development of a process to identify opportunities for biological restoration and the development of techniques for bringing this restoration about are only now being examined by the research community. Activity in the area of biological restoration will increase as more knowledge becomes available.

2.4.6 SIXTH STRATEGY

HABITAT DEVELOPMENT

Invest in activities to improve the natural productive capacity of fish habitats when proven techniques are available and it is economically feasible or socially desirable.

SUPPORTING STATEMENT

A number of techniques are available to improve the natural productivity of fish habitats and produce fish at a level above that which has been historically possible. Physical improvement is the most common type of fish habitat development. Activities may include the provision of spawning areas, and the removal of natural barriers to fish passage, thereby making available previously unutilized habitat. Efforts to develop habitat and promote the growth of fish communities in the marine environment, through the creation of artificial reefs, have had limited application in Canada.

The production of fish in many lakes and rivers in Canada is limited by the lack of suitable nutrients to support a substantial food source for the fish. It has been shown in some areas that the controlled addition of chemical nutrients such as phosphates and nitrates to these waters can lead to better fish production. Other opportunities for improving natural production are still in the experimental stage. These may take the form of biological introductions of plants, fish or fish food organisms to selected fish habitats.

2.4.7 SEVENTH STRATEGY

SCIENTIFIC RESEARCH

Conduct scientific research to provide the information and technology necessary for the conservation, restoration and development of fish habitats.

SUPPORTING STATEMENT

Scientific knowledge is essential to an effective fisheries and ocean management program. Within the context of habitat management, it forms the basis for decisions on conservation, prevention, mitigation, compensation, restoration, and development. Achievement of the department's proposed habitat goals would require a better understanding of the relationship between fish and their habitats. It would also demand that selective evaluations be undertaken to determine the effectiveness of state-of-the-art solutions employed to mitigate or compensate for damages to habitats sustaining the nation's fisheries resources.

Habitat management interventions require detailed information on the distribution, migration, life history, ecology and physiology of fisheries resources and their habitats. Much of the same information is required to support interventions to regulate the harvesting of these stocks. The department should therefore commit itself to continuing a broad program of scientific research, a portion of which is directed toward achieving the following habitat-related objectives:

- (a) improve the understanding of the relationship between fish stocks and their habitat in order to detect trends and to justify the need for remedial protection measures;

- (b) determine the effects of human activities on fisheries resources and the habitat systems that support them, and how adverse effects may be mitigated;
- (c) develop and refine our understanding of techniques to quantify fish habitats, restore degraded habitats, and enhance the productive capability of natural areas;
- (d) incorporate scientific knowledge into habitat protection policy and programs, both on an industrial sectoral basis and in regional resource use planning;
- (e) evaluate the effectiveness of decisions taken to restore and develop fish habitats; and
- (f) develop improved methods of evaluating the economic and social worth of fish habitats, provide risk-benefit and cost analyses and verifications of proponents' economic analyses relating to projects that could impact on fisheries.

My policy is that there will be no loss
of quality fish habitat.

(St. John's, Newfoundland - May 1983)

- Honourable Pierre DeBané
Minister of Fisheries and
Oceans

CHAPTER THREE

GUIDE TO APPLICATION

General Considerations

This chapter is intended to provide a description of the department's proposed operational approach to the protection of fish habitat. The material is organized in the form of a strategy-by-strategy guide to application and will provide operational information on proposed habitat policy to officials at all levels within the department, as well as to other interested persons, companies and government agencies.

The department's main responsibility with respect to fish habitat is to see that the requirements of the Fisheries Act are met. This is described in some detail in the next section under the Protection Strategy. However, the effective implementation of other federal legislation could also assist the achievement of habitat management goals. The department therefore will continue to work closely with the Department of Indian Affairs and Northern Development in the administration of the Northern Inland Waters Act and the Arctic Waters Pollution Prevention Act in an effort to prevent the physical and chemical degradation of fish habitat in the North. Similarly, the department will continue to actively cooperate with and establish requirements for protecting fisheries under the Ocean Dumping Control Act and the Environmental Contaminants Act, administered by Environment Canada, the Pest Control Products Act of Agriculture Canada, and the Canada Shipping Act, administered by Transport Canada. Fisheries protection requirements associated with hydrocarbon development will continue to be addressed through the Canada Oil and Gas Lands Administration (COGLA) through the provisions of the Oil and Gas Production and Conservation Act.

The department recognizes the difficulties in identifying and controlling non-point-sources of chemical contamination, especially since the Fisheries Act may not be used to deal with fish habitat problems where the person or persons responsible cannot be identified, or where there is an

uncertain relationship between cause and effect. The preferred approach, therefore, would be to prevent the distribution and use of chemicals which are likely to cause serious effects on fish and fish habitat and to ensure that proper controls and surveillance are in place to see that users comply with safety requirements. This would be accomplished through departmental involvement in the administration of other federal legislation, particularly the Environmental Contaminants Act and the Pest Control Products Act.

In terms of the department's current practice and level of resources devoted to habitat management, emphasis will continue to be placed on two of the proposed strategies: **habitat protection** and **habitat research**. Recent government emphasis on job creation has stimulated some limited activity under the proposed **habitat restoration, community involvement, and habitat development** strategies. Some work has commenced under the proposed **cooperative resource planning and public information strategies**, but fuller implementation would require an increased allocation in support of these activities on a continuing basis. As proposed, the **habitat development and public consultation strategy** will demand a much higher level of effort by the department and additional program resources would be needed to enable this strategy to be fully implemented.

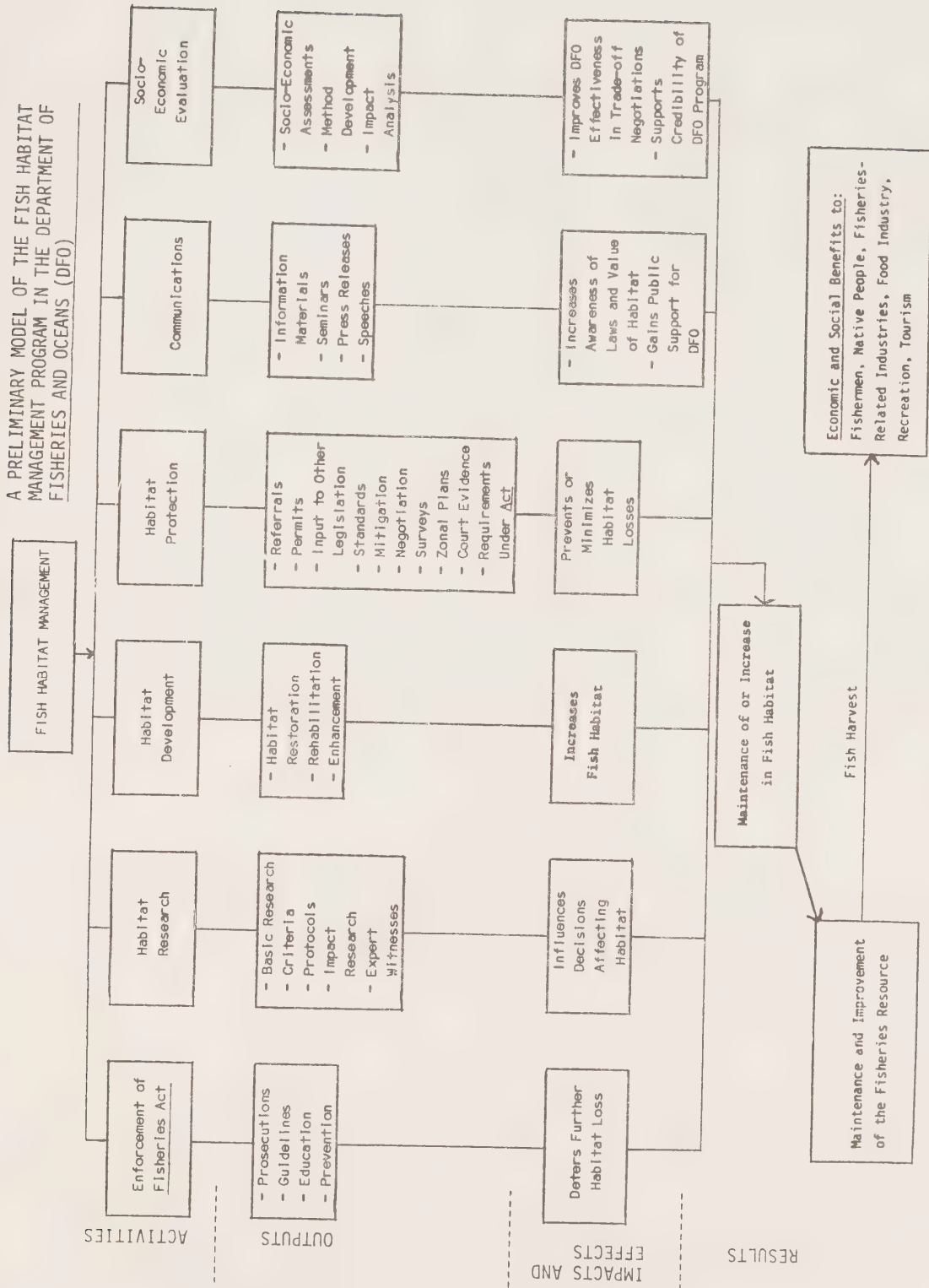
A schematic representation of the various departmental activities which would contribute to the proposed fish habitat management strategies is presented in Figure 3. This so-called "preliminary model" is not intended to represent bureaucratic reporting relationships, but rather the various outputs, effects and ultimate results of the combined activities.

3.1 Applying the Protection Strategy

THE NO NET LOSS WORKING PRINCIPLE

The proposed working principle of NO NET LOSS should be applied by the department to prevent losses to the productive capacity of habitats that support Canada's fisheries resources, and to meet the proposed habitat conservation goal. The NO NET LOSS principle could be used most readily to potential physical disruptions of spawning grounds, rearing areas and living space,

Figure 3



migration access, and food supply areas. It would also be applicable to the maintenance of water quality in fisheries waters receiving liquid waste discharges.

Application of the NO NET LOSS principle would not mean that most undertakings and activities in or near water would have to be stopped, or that unreasonable measures would be imposed on their design or operation. Liquid wastes would continue to be discharged into Canada's fisheries waters after suitable treatment, marinas and port developments would proceed using safe designs, and mineral exploitation would take place under environmental controls designed to protect fisheries. As a matter of good practice however, each development would have to be evaluated in the planning phase to determine if its impact on fish habitat would reduce the capability of that habitat to sustain fisheries resources.

The proposed NO NET LOSS approach is meant to signal a renewed effort by the department to ensure that the social and economic benefits derived by Canadians from the productive capacity of fish habitats and the fisheries resources they support are conserved in perpetuity. To quote from the remarks of Roméo LeBlanc following amendment of the habitat provisions of the Fisheries Act in 1977, "we are not going to sit around while habitat gets nibbled to death".

With respect to the control of deleterious substances under section 33 of the Act, the Environmental Protection Service of Environment Canada continues to act on behalf of Fisheries and Oceans under an interim administrative arrangement to ensure that federal responsibilities for protecting fish from pollution discharges are met. However, the department retains the right to intervene directly (including the laying of charges) where fish and fish habitat are being affected by pollution, including the deposition of pesticides and environmental contaminants. The Minister of Fisheries and Oceans has accepted a recommendation of the Pearse Commission on Pacific Fisheries Policy (1982) that exclusive administrative responsibility over all habitat protection provisions in the Act be assigned to DFO. Officials of Fisheries and Oceans opened discussions in 1983 with Environment Canada regarding the future administration of section 33.

When the department becomes involved in pollution-related matters, section 33 should be administered on a site-specific, case-by-case basis. While compliance with national effluent regulations would be expected from industry, more stringent site-specific water quality and monitoring requirements might be prescribed by the department to protect the fisheries resource.

The following sub-sections describe a series of six steps that should be followed by the department in applying the proposed NO NET LOSS working principle and reaching decisions on particular proposals that would be regulated under the habitat provisions of the Fisheries Act. These steps are illustrated in Figure 4 and each is described in turn below.

3.1.1 Step I. Notification: Information and requests for DFO approval of projects or activities in or near the water should continue to come to the attention of the department in the following ways: (a) public announcement of the project, (b) calls from concerned citizens, (c) inquiries from the proponent, and (d) through established inter-agency referral systems. These referral systems enhance inter-agency communication and streamline the approval procedure for proponents. Examples include federal Regional Screening and Coordinating Committees, referrals from various provincial government agencies in British Columbia, the Canada-Nova Scotia Fisheries Advisory Committee, the Arctic Waters Advisory Committee, the federal-provincial stream alterations committees (New Brunswick and Prince Edward Island), and referrals under the federal Navigable Waters Protection Act. Some consideration is being given to establishing a regulated authorization system under which it would be mandatory for proponents to apply to the department for approval. Additional details are given in section 4.3 of this paper.

3.1.2 Step II. Examination: Once information on a proposal is received, the department should undertake a detailed examination of the potential implications of the undertaking to the fisheries resource. Depending on the size of the project, this step could take anywhere from a few days to several years. Obtaining and presenting relevant information on the project and on the fish habitat that is likely to be affected should continue to be the responsibility of the proponent under section 33.1(1) of the Act. In cases where the

FIGURE 4

Flow Diagram of DFO Habitat Management Procedures for Achieving NO NET LOSS at
Proposed Land and Water Developments and Activities

STEP I
NOTIFICATION
BY PROPONENT

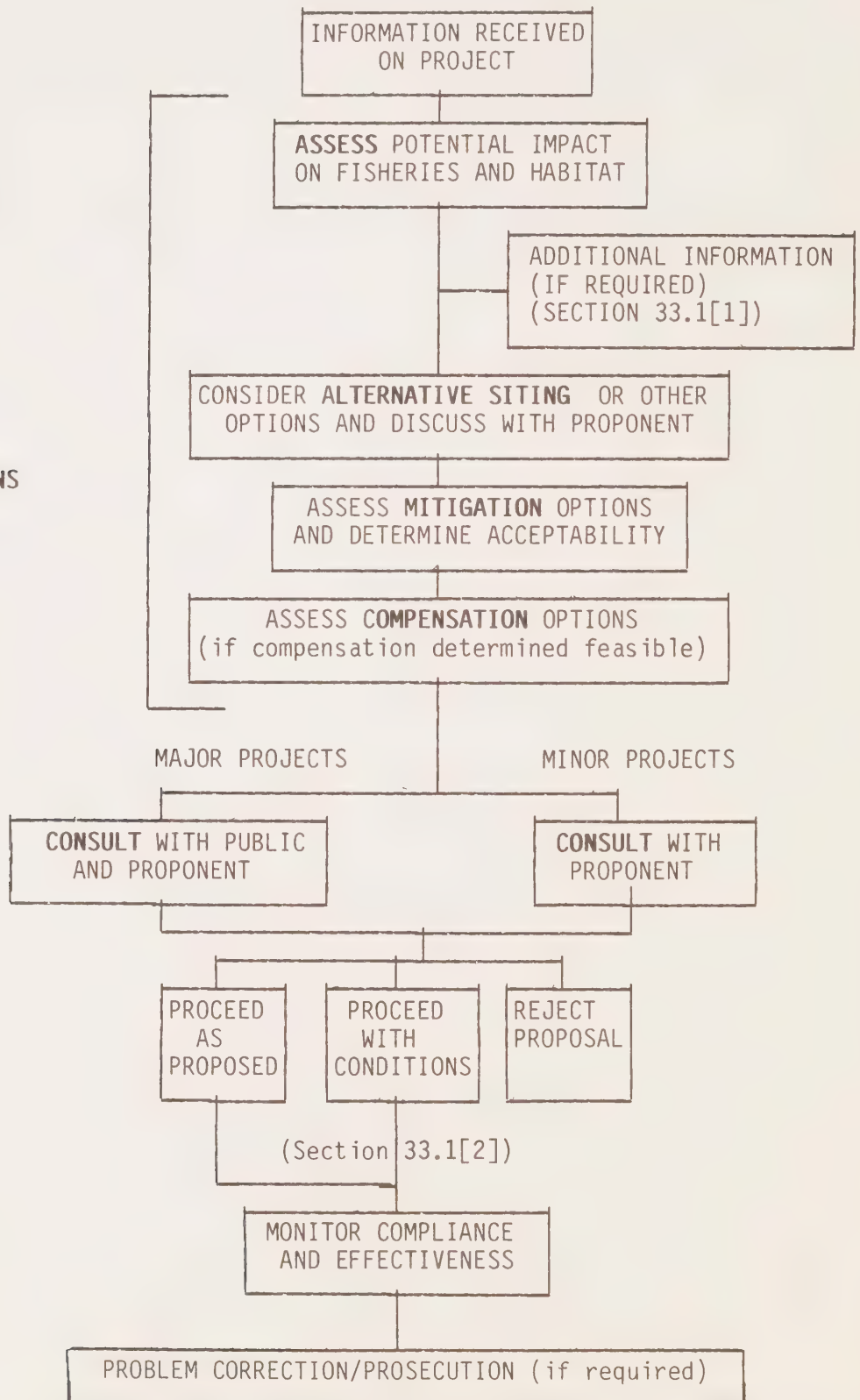
STEP II
EXAMINATION BY
FISHERIES & OCEANS

STEP III
CONSULTATION

STEP IV
DECISION

STEP V
AUDIT

STEP VI
COMPLIANCE AND
ENFORCEMENT



department has information on the local environment and fisheries, this should be made available to the proponent for use in preparing descriptive information, identifying potential effects and determining preventive actions through mitigation.

As an aid to proponents, the department prepares habitat protection guidelines for activities such as highway construction, dredging (Fraser River), forest harvesting (British Columbia), urban development (Newfoundland) and the use of explosives (Northwest Territories).

As part of the examination step, the proponent should be encouraged to consider **alternative siting or procedural options** as a means of avoiding potentially serious damage to fisheries resources. This would not be a mandatory step but in certain cases, where **mitigation** techniques and **compensation** in-kind may not be feasible solutions, alternative siting or other changes in an undertaking might prove to be an attractive option. Indeed, before any consideration would be given to possible compensatory measures, the search for alternative project sites should have been completed, yielding no viable options, and mitigation of any anticipated damages by other means should have been shown to be economically or technically impractical.

Compensation in-kind for anticipated losses of productive fish habitat capacity may be accepted by the department as a condition of approval but only as a last resort, to be considered after other options for protection had been ruled out. It would be important for the technical feasibility and management acceptability of proposals for compensation in-kind to be thoroughly explored and approved in principle by the department before final commitments were made by project proponents.

The effectiveness of many techniques to replace or develop habitat is unproven and the biological implications of applying compensatory solutions to different stocks in different locations would have to be approached with caution. Similarly, the restoration of recently degraded habitat would be viewed as the responsibility of those who caused the problem; such a solution should not be acceptable as a form of compensation. Compensation in-kind would

not be an easily prescribed solution to fish habitat problems, but it would offer an opportunity to resolve conflict in certain cases.

Compensation may involve the replacement or development of an alternative natural habitat to be used by the same stock of fish likely to be affected. In some special situations, compensation may include the artificial production of fish through use of hatcheries, spawning channels, incubation boxes or other techniques. These artificial techniques should generally be viewed as less desirable options because it is the clear preference of the department to maintain traditional fish harvesting operations through natural reproduction and rearing. Where there is sufficient doubt as to the long-term effectiveness of compensation measures, the department should consider the option of having the proponent post a performance bond as a form of guarantee.

Cash should not be considered as an acceptable form of compensation.

3.1.3 Step III. Public Consultation: The department recognizes the need to provide opportunities for public review and input to decisions on developments which have broad social, economic or environmental implications. The department has frequently participated in public reviews and inquiries sponsored by another department or by a provincial government. As a preference, it should continue to be the policy of the department to participate in such reviews and inquiries as a means of obtaining public input into decisions on fish habitat conservation.

However, there will be instances when no other agency or government is prepared to establish a timely public consultation process for an important project. In such circumstances, the Minister could ask his officials to organize an appropriate process for public review and input, for the purpose of providing him with a separate channel of advice prior to making a final decision. Additional information on the proposed form of the consultation process is provided below in section 3.3.

3.1.4 Step IV. Decision. Following its examination of the proposed project and the results of any public consultation, the department must decide whether

or not the project is likely to result in a net loss of productive habitat capacity for fisheries. If a loss is likely, the department would then have to decide if the proponent's plans to mitigate or compensate are acceptable. Where adequate scientific and technical knowledge to predict impacts or to prescribe mitigation or compensation solutions is either unavailable or unattainable, the department should take a conservative approach to habitat protection, possibly leading to more stringent requirements being placed on the proponents.

Depending on the outcome of these deliberations, the department could decide directly, or through a recommendation to the Minister in cases involving major developments:

- (i) to permit the proposal to proceed as proposed (no harm expected to the productive capacity of fish habitat),
- (ii) to permit the proposal to proceed with conditions (often with respect to schedule, methods, equipment, environmental control and mitigation measures, compensation, follow-up monitoring or training of personnel), or
- (iii) to reject the proposal (potential losses to the fisheries judged unacceptable).

3.1.5 Step V. Audit: Effectiveness evaluation should be employed by the department to determine the soundness of decisions taken in order to achieve no net loss. This is especially true in cases where conditions and restrictions have been imposed on a proponent, and where commitments have been made by the proponent to mitigate or compensate for any losses. Monitoring of projects during construction and start-up operation should be required of the proponent as a condition of project approval by the department. Surveillance of the activity or work should, of course, be carried out by departmental officials. There should be adequate monitoring information available to evaluate the condition of fish habitat and the effectiveness of specified conditions to mitigate or compensate, after the project has been completed or the activity has taken place.

Compensation solutions frequently involve the application of state-of-the-art technology for which it is not always possible to predict the outcome with certainty. In such cases, the proponent could be required as a condition of approval by the department to carry out a monitoring program to assess the effectiveness of the particular compensation solution. Should the monitoring show that a particular state-of-the-art compensatory solution is not effective, the proponent could be required to plan and implement another solution to meet the government's fish habitat conservation goal.

3.1.6 Step VI. Compliance and Enforcement: In administering the Fisheries Act, the department prefers to prevent damage to habitat and avoid losses rather than punish offenders after the fact. However, when it is contravened and fish habitat is destroyed or degraded, the Act should continue to be enforced. In jurisdictions where this federal policy applies, enforcement should be based on technical evaluation and fully justified on the basis of conserving fisheries resources.

The Act contains powers to deal with damage to fish habitat, destruction of fish, obstruction of fish passage, minimum flow requirements and the screening of water intakes. In addition, comprehensive powers are provided in section 33 for controlling deleterious substances that might affect fisheries including the authority to prohibit discharges, to set regulations, to request plans and to require modifications. Regulations and guidelines have been established that stipulate the quality of effluents that are allowed to be deposited from various industrial sectors (mining, oil refining, pulp and paper, chlor-alkali production and food processing).

In the event of a violation, departmental officials should make every reasonable effort to consult with the offending party before enforcement action is taken. Prior to making a formal order under section 33.1 (2) to modify, restrict or close a work or undertaking, the Minister would offer to consult with colleagues in other interested federal departments and with the governments of any provinces that may be affected. If necessary, a court injunction could be requested under sections 31(4) and 33(9) to halt the work or undertaking.

Private citizens may initiate prosecutions under the habitat provisions of the Fisheries Act. The department should support such actions and arrange for legal counsel depending upon the economic or social importance of the fisheries resource affected or likely to be affected.

The prime responsibility for ensuring that polluters clean up spills of oil and other pollutants should continue to reside with other federal and provincial agencies, and the role of the department should be to provide advice on potential threats to fish and their habitat, and on remedial actions. Where discharges are detected that present an immediate threat to fisheries, the department should intervene directly using the general prohibition powers of section 33 to stop the discharge and arrange for clean up. The department is empowered under section 33(10) to recover the costs of clean up operations where fisheries resources or fish habitat are threatened or disrupted.

The department is also responsible, in areas where it manages the fisheries, for investigating fish kills and ensuring that corrective action is taken. Alleged violators of the Act should be prosecuted when circumstances warrant.

Examples of Protection Strategy Application

- In the case of the proposed Quinsam Coal development in British Columbia, notification came from the provincial government in the form of a request for a review of the project by federal agencies. Deficiencies were identified in the environmental assessment as it related to fish habitat and many of these were addressed by the proponent during a three-year period. Outstanding concerns centre around the acid generation potential of the ore body and the potential adverse effects on Pacific salmon stocks if it is not properly controlled. The Minister has indicated that the public must be consulted before he would be prepared to take a final decision on this project.
- The Lower Churchill Hydroelectric Development in Labrador was registered by the Atlantic Regional Screening and Coordinating Committee (federal) in 1978. An Environmental Impact Statement was prepared by the proponent as a

requirement of the federal Environmental Assessment and Review Process (EARP) and public hearings were conducted in a number of communities in the province. The proponent offered a number of possible ways of compensating for the residual loss of productive salmonid habitat in the river. These included proposals to stock (a) land-locked salmon, and (b) artificially produced Atlantic salmon smolts using heated water from the hydro facility. The regional office of the department approved the project subject to a number of conditions relating to mitigation, compensation and monitoring.

3.2 Applying the Cooperative Resource Planning Strategy

The department should continue to promote participation with other agencies, levels of government or resource users, in cooperative resource planning activities. Participation in such activities would allow the department to identify important fisheries resources for which the supporting habitat must be protected, and to influence the plans of other competing users of water before irreversible commitments are made.

For any cooperative resource planning activity in which the department becomes involved, the following considerations would contribute to the ultimate success of the plan:

- (a) the identification of a geographic zone (such as a lake, river basin, estuary, bay or portion of offshore marine waters, and the adjacent lands or coastline), as a workable unit for planning and management;
- (b) the zone under consideration to contain fish habitats or worthwhile opportunities for fisheries management, restoration or development;
- (c) a habitat inventory to integrate fisheries management goals with those of habitat management;

- (d) habitats necessary for maintenance or development of important fisheries to be identified for priority protection from competing users to enable fisheries stock management goals to be met;
- (e) competing users who disrupt fish habitat to not only participate in planning, but also in the restoration and development of habitats, where appropriate; and,
- (f) provinces and territories, municipalities, other resource users and concerned citizen groups to be prepared to discuss common goals and objectives, participate in planning, and to assist in the protection of important fish habitats through local by-laws and regulations.

The results of ecological studies, fisheries research and habitat surveys conducted for project impact assessment and other purposes should also be utilized in the preparation of resource sensitivity maps and cooperative resource management plans. Improved habitat inventories would be needed to identify those areas which are either highly productive or may serve as fish habitat sanctuaries. Such areas could be essential for the continued well-being of important capture fisheries as well as for the development of such private initiatives as the salmon cage culture industry or shellfish aquaculture.

Examples of Cooperative Resource Planning Strategy Application

- In an attempt to achieve best use of natural resources in the Fraser River estuary in British Columbia, a plan is being prepared with the participation of all concerned parties. The department has identified vital fish habitats in the estuary and is proceeding under the understanding that protection, mitigation, restoration and compensation will ensure that no further loss of vital habitats occurs.

- In St. John's, Newfoundland, conflict involving fisheries resource protection in an urban river basin led to the establishment of an integrated planning group to guide future municipal expansion so that damage to fish habitat is avoided and restoration opportunities are pursued.
- Resource management and planning in the Cowichan River estuary on Vancouver Island are being pursued by a number of government agencies through the identification of sensitive habitats and the establishment of three zones to accommodate competing uses. A similar process is being pursued in the Squamish River estuary, on the lower mainland of British Columbia.
- The department has prepared maps of fisheries and environmental sensitivities for in the marine waters off Canada's east, west and Arctic coasts which can serve as planning guides for the shipping and oil and gas industries. These documents illustrate not only the department's concern for the fisheries resource and habitat protection, but also provide an important focus for planning offshore developments in cooperation with other industrial sectors.

3.3 Applying the Public Consultation Strategy

Public consultation should be actively pursued by the department on major developments that will affect the fisheries resource and where a discretionary decision must be made by federal fisheries managers and the Minister. A number of difficult questions may arise in such cases, some of which include: Should the project proceed in the location proposed and according to the original design and layout? How will potential damages to the fisheries be mitigated? If the damage is not eliminated completely, are the compensatory measures sufficient to meet the long term needs of the fisheries?

Where the department organizes public consultation for major projects, the consultation should take the form of open public meetings chaired by a senior official of the department. There should be an open invitation to interested parties including the proponent developer, other federal agencies, other levels of government and concerned citizen's groups. The proponent should be given an opportunity to outline his project, including the steps to be taken

in arriving at a NO NET LOSS solution, and all government agencies including the department, should outline the results of their review of the project. Such a process would allow interested parties to express their views and concerns respecting the potential effects of proposed developments on the fisheries resources.

In instances where the issues were highly technical and controversial, the Minister could appoint a special independent task force to review the situation and call public meetings. If, however, it is concluded that the issues at stake are not properly within the department's mandate, the department should not require public consultations but should favour open public disclosure of the data used to reach the conclusion.

Examples of Public Consultation Strategy Application

- The department has participated in public consultations on a number of projects including the Miramichi Dredging Project, the Lepreau Nuclear Development, the Squamish Estuary Management Plan, the Fraser Estuary Management Plan, the Roberts Bank Port Expansion, and many others, several of which were organized through the federal Environmental Assessment and Review Process (EARP).
- Departmental officials involved in habitat management often meet with industrial developers, other government officials, clients in the fishing industry, and members of the public to discuss particular projects and planning initiatives. On other occasions, projects are reviewed publically under the auspices of provincial or federal environmental assessment review procedures, and the department becomes fully involved in the public hearing process.
- Other mechanisms used by the department to obtain public input to fish habitat decisions may include: (i) TERMPOL reviews by the federal Department of Transport for proposed marine terminals, (ii) Territorial Water Board hearings on water licence applications in the North, (iii) public reviews of transboundary water issues by the International Joint Commission, (iv) departmentally sponsored workshops, (v) Fisheries Advisory Committees,

(vi) Fisheries Scientific Review Panels, (vii) local municipal public meetings on water-related developments, and (viii) formal public inquiries on specific subjects.

3.4 Applying the Public Information and Community Involvement Strategy

The department publishes and distributes information on the importance of fish habitat and the issues that threaten it. Recent examples include brochures titled (a) Fish Habitat: The Foundation of Canada's Fisheries, (b) Fish Habitat: Conserving our Hidden Assets, and (c) Canada's Fish Habitat Law. The recently produced film on the Carnation Creek forestry - fish habitat research project on Vancouver Island, B.C., was supported by Fisheries and Oceans, Environment Canada, two provincial government agencies and a private forest company. Such joint ventures are valuable for broadening public participation and producing information that is not otherwise affordable.

Where opportunities arise across the country, a higher degree of interaction between program planners and the interested, concerned public should be encouraged. Salmon restoration and development programs sponsored by the federal government in Newfoundland and British Columbia have attracted and encouraged direct public involvement in the implementation of local projects. In British Columbia, the Salmonid Enhancement Program has developed an education package about salmon for use in the school systems and has sponsored highly visible stream restoration and development projects in urban areas. Community advisors and fisheries staff also cooperate with a Vancouver newspaper which sponsors a "Save the Salmon" public involvement project. This approach has helped to raise the awareness of fish habitat conservation and development in the minds of local citizens and groups.

3.5 Applying the Restoration Strategy

The department should encourage the private sector to undertake projects to restore habitats in areas recently degraded by industrial activity. This would be especially applicable in situations where the reason for habitat degradation continues, as in the case of the discharge of liquid wastes.

Section 33 of the Fisheries Act contains a general prohibition against the discharge of substances which are deleterious to fish or fish habitat, and a number of industry-specific regulations and guidelines under this section stipulate the quality of effluents which may be discharged into waters frequented by fish. More stringent, site-specific, water quality and monitoring requirements could be prescribed by the department to protect the fisheries resource.

In cases involving the restoration of fish habitat from the effects of non-point-source pollutants, such as urban run-off and agricultural practices, the department should provide advice on fisheries protection requirements and should work cooperatively with municipal and regional planning authorities.

Private organizations such as conservation groups, fishing associations and community service clubs may raise funds to restore fish habitat from the effects of physical damage such as forest harvesting, gravel mining, abandoned dams and general debris. The department should be prepared to provide technical advice and guidance, and might be in a position to support such projects financially, depending on the availability of public funds for such purposes.

Examples of Restoration Strategy Application

- On the St. Croix River between New Brunswick and Maine, pollution control at a pulp mill in the United States and the reconstruction of a fish passage facility at a hydroelectric site in Canada has resulted in the partial restoration of a once highly productive Atlantic salmon river.
- Over the past 75 years, the estuary of the Campbell River on Vancouver Island has been degraded through its usage by the forest industry to sort and store logs. A recent change to dryland sorting by the company concerned provided the opportunity to restore 22 hectares (over 50 acres) of estuarine habitat for salmonids. Four intertidal islands were created and then planted with marsh vegetation.

- The banning of DDT has curtailed serious losses of salmon in New Brunswick and virtually eliminated residue build-up in fish flesh wherever the pesticide had been used.
- For several decades, large quantities of untreated organic wastes from industrial sources caused a serious reduction in the concentration of dissolved oxygen in the upper Saint John River. As a consequence, Atlantic salmon and other aquatic life suffered. In the mid-1970s, after years of assessment and negotiation, waste treatment facilities were installed by the industry, resulting in vastly improved river water quality and the partial restoration of fish habitat for salmon and other fish species.
- In the lower Great Lakes, installation of tertiary waste treatment plants has resulted in a major reduction in phosphate loadings. Serious eutrophication and oxygen depletion has been reversed and many fish populations are increasing in size and value.
- Following invasion of the upper Great Lakes by the parasitic sea lamprey early in this century, the governments of Canada and the United States instituted a successful program to control the lamprey, thereby enabling lake trout stocks to recover.

3.6 Applying the Development Strategy

The department should use public monies to undertake habitat development projects where feasibility studies have demonstrated the economic or social desirability, and where the benefits outweigh the costs. Such projects would employ proven methods to alter the physical, chemical and biological components of the aquatic environment to improve the production of fish.

The private sector might become involved in habitat development through negotiation with the department, frequently as a means of compensating for predicted losses of habitat productive capacity due to industrial activity. The private sector, as good corporate citizens, might also decide to participate in such projects on its own initiative.

Because state-of-the-art methods are frequently employed under this strategy, a continuing research and development function would be required, combined with post-implementation evaluations of projects. Industrial proponents could be required to undertake such evaluations as a condition of project approval by the department.

Examples of Development Strategy Application

- The amount of freshwater habitat available to Atlantic salmon in the Bay of Fundy area was greatly augmented in 1962 when access was provided past previously impassable falls on the Big Salmon River, New Brunswick. As a consequence of that action and a subsequent stocking program, the salmon run in that river increased one hundred fold (from about 50 fish to almost 5000).
- The controlled addition of nutrients in the Great Central Lake on Vancouver Island has led to increased phytoplankton and zooplankton production, an essential food source of young sockeye salmon. The results of an ongoing research study suggest that large juvenile sockeye are produced and that more adults return to spawn.
- Under the Pacific Salmonid Enhancement Program, cost-effective physical improvements to the streambed habitat have brought about increases in the production of Pacific salmon and steelhead trout.

3.7 Applying the Research Strategy

The department should continue to operate a comprehensive habitat-related research program on priority habitat issues. Priorities should be established through consultative arrangements with fishery managers, habitat managers, the fishing industry and the public, and research findings should continue to be published in scientific and technical publications. In-house scientific investigations currently emphasize the following habitat-related problem areas:

- instream flow requirements for fish
- effects of logging practices on fish

- effects of tidal barriers on fish
- effects of liquid waste discharges and toxic chemicals on fish
- effects of hydroelectric impoundments on fish
- effects of acidification on fish
- effects of hydrocarbons (particularly oil) on fish
- effects of other chemical contaminants on fish
- effects of radionuclides on fish

Evaluations of the effectiveness of decisions taken to achieve NO NET LOSS should be undertaken by the department as program resources permit and in accordance with priorities established by the department for such evaluations. Industrial and government proponents could be required to undertake studies on the effectiveness of habitat mitigation and compensation solutions as a condition of project approval by the department. Similarly, the department should encourage and participate in cooperative research programs with industry groups and associations in an effort to improve knowledge in areas of common interest.

Examples of Research Strategy Application

- Acid rain is one of the most significant threats to the survival of freshwater fisheries resources in eastern Canada. The department is engaged in a major research effort to determine the mechanisms and magnitude of acid rain impact, and define the feasibility of measures to protect seriously endangered populations. This research will determine the effects of heavy metals, sulphur dioxide, and other airborne contaminants on fish populations, and thereby provide information on the need for controls in both the United States and Canada.
- Scientific assessments are also carried out to determine inter-relationships between fish and their habitats. Contaminants found in marine waters and in the liver and gonads of fish such as the Atlantic cod are assessed for their sublethal effects on reproduction.

- Studies on the impact of logging practices on salmonid reproduction and productivity are of value to the fisheries and forestry sectors. Similarly, research on the effects on fish of hydroelectric impoundments and altered hydrological regimes help to avoid the problems of the past.
- Information from toxicological research is used to establish regulations and water quality objectives, and to prevent damage to fish habitat, the fishery resource, and the fishing industry. The department conducts such research to assess the effects of chemical substances on fish and fish habitat. In addition, laboratory observations are verified in the field.
- Identifying the socio-economic impact of habitat change to the fisheries is frequently hampered by deficiencies in economic theory and methodology, especially for cases involving recreational fisheries where no market prices exist. The department has studies underway to quantify socio-economic impacts from such habitat threats as acid rain, toxic chemicals and placer mining.
- Research is underway in Arctic waters to determine the possible effects of tanker traffic on the migration of marine mammals.

My investigations have left me much more optimistic about the possibilities, not only for preserving the capabilities of our aquatic resources to produce fish, but also for enhancing them.

(Vancouver, B.C. - September 1982)

- Dr. Peter Pearse
Commissioner
Pacific Fisheries Policy

CHAPTER FOUR

ADDITIONAL POLICY ISSUES FOR FISH HABITAT MANAGEMENT

4.1 Socio-Economic Considerations

Ridiculous as it seems, it has always been necessary to meet industrial abuses, whether proposed or active, with values measured in dollars. Fortunately, fisheries economists are constantly refining ever more sophisticated ways of providing and supporting figures of this sort and forcing developers back to their drawing boards.

- Roderick Haig-Brown
Author and Conservationist

In this section, some of the problems associated with evaluating the socio-economic viability of fish habitat management activities are raised for discussion. It is important that these deficiencies be addressed as a matter of priority, in order to improve program delivery, especially in view of the importance given to socio-economic considerations in the proposed objective and three goals outlined above.

Fish habitat management is viewed as being desirable insofar as it remains both economically and socially desirable. At the present time, unfortunately, appropriate methodologies for evaluating the socio-economic viability of habitat management activities have yet to be fully developed. Much of this is attributable to the fact that in many cases it is simply impossible to quantify accurately all the costs and benefits that may accrue from a habitat management activity. Not only are there economic measurement problems, but there are also deficiencies in the biological data base which contribute to the general problem of quantification.

On the biological side, it is often difficult to provide good data linking an observed disruptive event undermining the productive capacity of fish habitat, to ultimate losses in a fishery or fisheries which would have harvested the fish produced. In many instances, it should not be surprising that the losses would not be reflected in the number of fish harvested, because the damage to habitat in one particular area may affect only a relatively small portion of the supply of fish to various fisheries. However, taken in the aggregate, when the habitat of fish stocks is widely damaged by activities such as highway construction, waste disposal or forest harvesting operations, the sum total will be a net loss to Canada's fisheries. On the Pacific coast, steps are being taken to improve an understanding of these interrelationships. A habitat biological model has been developed to quantify impacts to various stages in the life history of Pacific salmon, and to relate these to fish stock production, thereby facilitating evaluation using conventional economic measurement techniques.

Despite these difficulties with biological measurement, there have been instances where there is no doubt as to the effect of habitat disruption on the supply of fish. A case in point occurred on the Coquitlam River near Vancouver where over a twenty-year period, salmon production has been reduced by an estimated 90 per cent, largely as a result of uncontrolled gravel mining and flood control devices in the river. Similarly, when a dam on the Point Wolf River, now part of Fundy National Park, prevented salmon from reaching their habitat over a century ago, the stock from that river collapsed. Regretably, most habitat issues are not so clearly documented and protection decisions cannot wait for complete scientific studies.

On the economic side, most experts would acknowledge that there is considerable room for advancement and improvement in the existing frameworks and methodologies for undertaking economic analyses of fish habitat management issues and options. Cost-benefit analysis, long held as the most appropriate socio-economic analytical tool has been shown to suffer from several weaknesses, some inherent in the methodology itself, and others related to ways in which data used for analysis is collected and assembled. For evaluation of the Pacific Salmonid Enhancement Program, a system of accounts was developed as an

alternative to allow the many dimensions of alternative proposals to be treated more even-handedly.

If the supply of fish for both a recreational fishery and a commercial fishery is likely to be reduced by damage to the habitat, how do we measure the costs incurred by the fishery? For the recreational fishery for instance, do we use the willingness of anglers to pay to avoid the loss or the amount they would have to be compensated for the loss? Other economic values are even more difficult to measure. For example there are those in the general population who would place value on the assurance of future use of a resource (option value), or who would benefit from the knowledge that a fisheries resource is available in an area, whether or not they ever use it (existence value). In these cases, explicit values for fisheries resources are scarce because the markets that would define them seldom exist.

There are also social considerations which must be added to the equation. Will the predicted reduction in the supply of fish be such that the fisheries in question would be rendered non-viable, thus costing the guides, outfitters, commercial fishermen and fish plant workers their means of livelihood?

If habitat is to be destroyed, the impacts to those in society who either use the resources produced by the habitat or are willing to pay for the continued existence of these resources must be identified. Further they must be identified in such a way that a decision framework is developed demonstrating the trade-offs between new net benefits and new net losses (in socio-economic terms) from the development.

4.2 Paying the Costs of Fish Habitat Assessment Studies

Some uncertainty has been expressed respecting the financial responsibility of the department and the other parties engaged in efforts to resolve conflicts involving fish habitat. Discussions frequently focus on the question of responsibility for providing baseline studies, scientific research studies, accelerated studies, impact assessments, and the like. In an effort to reduce misunderstanding on this important subject, the department's position and legal authority is briefly outlined in this section.

The department should not provide financial or other support to undertake site-specific impact assessments of proposed developments to enable proponents to plan, design, construct and operate their activities in a manner that is compatible with sound fish habitat management. Such assessments should be the responsibility of the proponent, usually following discussion with the department on conceptual plans and the proposed terms of reference for any assessments. Where the government lacks baseline fisheries data from an area and such information is necessary to judge the impact of a particular development, then the proponent should be asked either to conduct those accelerated baseline studies or to support the costs of the data collection, if the department conducts the work on an accelerated basis.

The legal authority for this approach is derived from section 33.1(1) of the Fisheries Act, under which the Minister of Fisheries and Oceans may request analyses, samples, evaluations, studies or other information relating to the water, place or fish habitat that is likely to be affected by a work or undertaking.

For its part, the department conducts programs of baseline scientific research and other investigations to study problems related to fish habitat management. In addition, the department has in-house programs for fish stock assessment and ocean science, the results of which often may be used by fish habitat managers and the proponents of projects. The department also prepares and publishes both general and technical information for use by department staff, proponents of undertakings and the general public. These publications include technical guidelines on habitat problems and solutions associated with such activities as forest harvesting, dredging and road construction. These technical guidelines provide advice to developers on fisheries requirements, on mitigative techniques to avoid the habitat damage, and on compensation opportunities.

It is in the interest of the proponent to ensure that adequate information is provided on a timely basis. The department should be prepared to assist in this task by providing to interested parties the results of relevant scientific studies and other investigations that may be available within the

department. Where fisheries resources are at risk and where there is insufficient technical information available on which to base judgments, the department would, of necessity, take a conservative approach in order to protect fish habitat. This often results in the imposition of more stringent, and consequently more costly, requirements on the proponent as conditions of approval.

For cases involving existing, as opposed to proposed, works or undertakings that the department suspects may have resulted in fish habitat losses and subsequent damage to the fisheries, the owner should not be expected to provide information on the impact of his operation on fish habitat. Such studies should be financed and often undertaken by government. Some companies might undertake studies of the affected environment near their operations in order to prepare for negotiations with government agencies on environment-related control requirements. The owners of companies should continue to be responsible for providing records of the quantity and quality of effluent discharges in order to allow government agents to assess the deleterious nature of the wastes to fish.

4.3 Fish Habitat Authorization Systems

An important function of the department's fish habitat management program is to examine plans for proposed works and undertakings in or near the water in order to see that damage does not occur to the productive capacity of habitats supporting Canadian fisheries resources. Such an examination procedure does not imply that department staff will be blocking every project affecting fish habitats; rather it means the potential impact of the proposed work or undertaking on the fisheries should be considered. If potential problems are detected, the plans may have to be changed by the proponent.

The department generally relies on a number of inter-agency project referral systems in each region for the purpose of becoming aware of works and undertakings which may have an impact on fish habitats. Should action be required by the department, it may be carried out either directly under the Fisheries Act, or indirectly through the powers of another government agency. These referral systems serve to improve government inter-agency communication and to streamline the approval procedure for proponents.

Unfortunately, it has been found that not all proposals of potential concern to the department come to the attention of departmental officials. Accordingly, in Newfoundland Region, officials have requested approval of powers under the Newfoundland Fishery Regulations in an effort to improve the referral of projects which might harm fish habitat.

This could be accomplished by means of a regulation prescribing the manner and circumstances in which any information or material should be provided to the Minister without request. The information or material may include the plans, specifications, studies, procedures, schedules, analyses, samples or other information relating to a work or undertaking. It may also include evaluations, analyses, samples, studies or other information relating to the water, place or fish habitat that is or is likely to be affected by the work or undertaking.

The department would provide forms specifying the information required on proposed works or undertakings in particular regions, and a decision would be provided in writing to the proponent by a responsible departmental official. As a matter of policy, the need for such authorization systems will be determined by Regional Directors General and implemented under regulations specific to a province or territory and approved by the Governor-in-Council.

4.4 Increased Private Sector Participation

Many segments of the private sector utilize or impinge on fish habitats. Hydro utilities, mining companies, forest companies, and farmers, for example, may often disrupt or destroy fish habitat in producing their respective products. But fish habitat is also essential to maintain harvestable fish stocks, which support commercial and recreational fishermen, fish processors, native people, tourist operators, boat and motor builders, and net and tackle manufacturers.

At present there is no formal mechanism for the department to engage in information exchange and common problem solving with the private sector; nor is there a mechanism for the private sector to focus its resources on solving fish habitat management problems, or to restore and develop fish habitat.

A number of options for such a mechanism may be considered for further discussion and elaboration. For example, any one of the following could be developed to meet the common objectives of government and the private sector:

- (a) A national government-industry council or committee on fish habitat management could be established to generate ideas and reach agreements on cooperative endeavours in the areas of resource planning, habitat-related research, habitat awareness, habitat restoration and habitat development. Work would be carried out through individual commitments of members, using their own financial resources and staff capability.
- (b) Regional or national cooperative habitat research institutes could be established with members from interested industry groups and government agencies. A common fund could be created by contributions from each member and priority research projects would be undertaken.
- (c) A national Board or Foundation could be established with representation from government agencies and the private sector who are interested in promoting fish habitat management in Canada. This organization would (i) consider means of generating funds, (ii) decide on methods of distributing funds for such things as research, awareness, restoration and development, (iii) provide advice to the Minister of Fisheries and Oceans on habitat affairs in Canada, (iv) maintain an information system, and (v) identify the need for and pursue the establishment of fish habitat sanctuaries.

The above options are put forward for the purpose of stimulating discussion. The department encourages comment and suggestions from other government agencies, corporations, industry associations, and individuals on the question of increased private sector participation in fish habitat matters.

4.5 Improved Financing of Fish Habitat Initiatives

Conservation, restoration and development of fish habitats for the benefit of present and future generations or Canadians require that a sound investment and financial strategy be designed and adopted by the federal government and other interested parties.

Monies required to effectively conserve, restore and develop fish habitat cannot come from departmental allotments alone. Investment revenues could be generated through increased cost sharing among those sectors that impact on or benefit from fish habitat, through public interest groups, and through amended fiscal controls administered by the federal government.

Significant economic benefits to the private sector could result from investing in habitat improvement projects. Improved fish habitat produces more harvestable fish which directly benefit commercial and sport fishing enterprises, and indirectly benefit boat and motor builders, tackle makers, sales outlets, and the tourist industry. These industries have a stake in effective habitat management and it would thus seem fair that portions of the cost of habitat improvement be borne by those who stand to benefit from the increased fisheries resource values.

Most fishermen now make a direct cost contribution by way of licence fees. There is a precedent in other jurisdictions for applying the user-pay principle as well to a more broadly defined group of beneficiaries that includes all secondary and tertiary industries profiting from the fishing business. As a buffer against the inevitability of finite resource depletion, some jurisdictions are also investing a portion of the revenues from non-renewable resources, such as oil and gas, into renewable resource areas, such as fisheries.

Costs incurred by the department for research on certain subjects could be defrayed by directing costs to polluters or proponents whose actions disrupt or destroy fish or fish habitats. The private sector can also cooperate in voluntary funding of important projects of mutual interest.

Compensation in the form of replacement of destroyed habitat or provision of some other form of replacement to the fisheries resource is one of the most effective methods of ensuring that no net loss will accrue to Canada's fisheries resources.

Preliminary Survey of Financing Options

A preliminary survey has identified the following six areas for generating monies for investment in fish habitat conservation and development.

- (a) Levies against direct beneficiaries for habitat projects (e.g. commercial and sport licence surcharges, import tariffs on fish, export levies on fish, fish landings charges);
- (b) More generalized levies against indirect beneficiaries (e.g. surcharges against tourists, tourist industries, fishing equipment manufacturers);
- (c) Reinvestment of revenues from non-renewable resources into renewable resources (e.g. oil and gas royalties);
- (d) Punitive action against destroyers of fish habitat (e.g. fines, civil damages);
- (e) Joint project/program arrangements with other entities (e.g. fishery projects for native peoples and/or remote communities, cooperative research with industry);
- (f) Process and cost reduction associated with delivery of protective services (e.g. collaborative habitat protection).

This preliminary survey of options provides a basis for selection of those requiring more detailed study and discussions. The department is not prepared to propose any specific options at this time, but would welcome the views of interested parties on ideas presented in this section.

EXAMPLES

1. In the United States, import duties are applied on fishery products through the Saltonstall-Kennedy Act. Under this Act a certain percentage of the duties collected are earmarked for special grants for commercial fisheries research and development. In the 1981 fiscal year about \$10 million was made available in this way. (This also means that all Canadian fish imported to the U.S. generate revenue that assists in developing the U.S. fishery).

2. In the United States, under the Dingell-Johnson Act, a federal tax is levied on sport fishing gear for use in fisheries projects. In British Columbia, the provincial Ministry of the Environment has established a habitat conservation fund partially derived from a sur-tax on provincial fishing licences. Alberta also uses a special sport fishing licence fee which is applied to fisheries projects.
3. In Norway, Alaska and California, the governments are now utilizing oil and gas revenues for long-term development of renewable resources such as fisheries. In Canada, federal tax incentives have been successfully used to encourage installation of pollution control equipment. Similar incentives could be provided for habitat restoration and development projects.
4. In Canada, other natural resources are allocated to users on a resource rental basis. Forest companies pay stumpage and royalties based on the volume of wood harvested, ranchers pay grazing fees and oil companies bid for leases. Revenues are collected by the Crown and are used to help finance the cost of resource management. Beyond buying a licence to fish, no resource rent is charged to the fishing industry. It would therefore seem reasonable for industry to share the cost of fish habitat management projects. Such a cost recovery principle has been proposed by the Pacific Salmonid Enhancement Program.
5. The department has been engaged in a variety of cooperative government-industry research projects. Examples include the Arctic Marine Oil Spill Project (AMOP), Eastern Arctic Marine Environmental Studies (EAMES) and Offshore Labrador Biological Studies (OLABS). Cooperative involvement with other government initiatives such as the Northern Oil and Gas Action Plan (NOGAP) and the Environmental Studies Revolving Funds (ESRF) is also an important way to obtain commitments for financing habitat research programs.

4.6 Establishing Fish Habitat Sanctuaries

The department administers strong legislation which provides the necessary authority for protecting most habitat areas. However, this legislation has not always been adequate where private property is involved or where water rights in sensitive areas are not assigned to fisheries conservation. For example, a serious non-point-source habitat threat arising from land development activities adjacent to a critical fisheries resource area cannot always be averted without the threat of it arising again in the future. Use of legislation to conserve fish habitat has been criticized because it may result in the inequitable treatment of owners whose land development options have been reduced or eliminated. Other resource agencies encountering this problem have sought direct title to, or restoration to public ownership, of certain key lands.

The principle of acquiring land of ecological significance was recognized in the "Federal Policy on Land Use" (1980):

"The federal government will acquire and manage lands where necessary for those activities for which it is responsible so as to combine efficient provision of federal government services with the achievement of broader social, economic and environmental goals."

Where appropriate, some fisheries agencies now establish "fish sanctuaries" for purposes of fish propagation under the Fisheries Act. Penalties are provided for destruction or injury to these areas. Creation of marine parks to preserve unique or otherwise valuable aquatic ecological systems is gaining support in many areas and the strategy could be adopted by the department for habitat conservation. The province of British Columbia administers an Ecological Reserves program which was established some years ago.

The department views the acquisition of land and water rights as a strategy of last resort, but one for which, in some instances, there may be no

alternative. The concept needs further examination and discussion with interested groups. Contributions to a fund for fish habitat conservation and development sanctuaries could be invited. Tax deductibility has been used as an incentive in other jurisdictions and would encourage participation.

EXAMPLES

1. The Nature Conservancy of Canada, the National Second Century Fund of British Columbia and the Alberta "Buck for Wildlife" Fund are three examples of programs that were initiated to help conserve Canada's natural heritage. As a general approach, a special fund is established, administered by a Board of Directors, and the interest generated by the fund is used to purchase critical habitats.
2. The Roderick Haig-Brown Conservation Area on the Adams River in British Columbia was created by the joint action and financing of the National Second Century Fund of British Columbia, the Province of British Columbia and the Department of Fisheries and Oceans to conserve and protect vitally important sockeye salmon spawning beds along a seven mile reach of the river.
3. The department has worked with the Canadian Wildlife Service using DOE funding to acquire lands along the Pacific coast that are critical to both anadromous fish and migratory birds.

Canadian fish habitat management has
reached a new maturity.

(Moncton, New Brunswick - May 1978)

- Roméo LeBlanc
Former Minister of Fisheries
and Oceans

CHAPTER FIVE

CONCLUSION

Achieving the full economic and social benefits from Canada's commercial and recreational fisheries requires both wise control over fish harvest, and conservation, restoration and development of the fisheries resources and their habitat base. The preceding policy proposals are put forward to initiate the development of a forward-looking, realistic policy which will become a blueprint for fish habitat management in Canada, particularly in those areas where the federal government has the responsibility.

New approaches to increased private sector participation and careful investment in the future of Canada's renewable fisheries resource base are keys to protecting the public trust. The dividends of such stewardship would be harvested by generations to come from a healthy fish habitat base sustaining fisheries resources in perpetuity. All those interested are sincerely invited to provide comment on the development of a policy for fish habitat management, directly to the Minister of Fisheries and Oceans in Ottawa.

APPENDICES

THE FEDERAL MANDATE

Under the Constitution Act (1982), the federal government has legislative responsibility for Canada's fisheries. The Minister of Fisheries and Oceans has been assigned responsibility for sea coast and inland fisheries, marine science and administration of the Fisheries Act. A key component of the Minister's overall responsibility for fisheries management is the business of protecting fish and fish habitat from disruptive and destructive activities while fisheries and oceanographic research provide, among their outputs, the knowledge required for sound fish habitat management.

The habitat protection provisions of the Fisheries Act, which were strengthened by amendments in 1977, provide the Minister of Fisheries and Oceans with the following main powers:

- Section 20 The authority to require the construction, maintenance and operation of fish passage facilities at obstructions in rivers; to require financial support for fish hatchery establishments constructed and operated to maintain runs of migratory fish; to remove unused obstructions to fish passage; and to require a sufficient flow of water at all times below an obstruction for the safety of fish and the flooding of spawning grounds.
- Section 28 The authority to require the installation and maintenance of screens or guards to prevent the passage of fish into water intakes, ditches, canals and channels.
- Section 30 The authority to prohibit the destruction of fish by any means other than fishing.

Section 31 The authority to modify, restrict or prohibit any work or undertaking which is likely to result in the harmful alteration, disruption or destruction of fish habitat, a term that is defined in subsection 31 (5) of the Act.

Section 33 Comprehensive powers to protect fish and fish habitat from the discharge of deleterious substances; to request plans for developments which may affect fish; and to modify, restrict or prohibit certain works or undertakings. (Under an interim government arrangement, Environment Canada assists in the administration of the pollution control aspects of Section 33 pending the implementation of a new federal approach to environmental protection by that department).

Other Sections Definitions, penalties and additional powers are provided in Sections 31(3), 33.1(9), 33.4(1), 34, 52, 53, 55 and 56.

Fishery Regulations specific to provinces and territories are made pursuant to the Fisheries Act, and some of these also contain habitat protection sections.

The department is responsible for administration of the Great Lakes Fisheries Convention Act, which provides for Canada - U.S. rehabilitation of the Great Lakes. There are other federal laws that are directly compatible with the department's objectives for protecting fish and fish habitat as well. The department assists in their administration by providing advice and habitat specifications to the other departments concerned in an effort to ensure that fisheries interests and goals are recognized. Examples include the Pest Control Products Act, the Ocean Dumping Control Act, the Environmental Contaminants Act, the Canada Shipping Act, the Northern Inland Waters Act, the Arctic Waters Pollution Prevention Act the Navigable Waters Protection Act the Oil and Gas Production and Conservation Act. The department actively recommends amendments to federal legislation which may affect fish habitat management goals.

APPENDIX 2

GLOSSARY OF FISH HABITAT MANAGEMENT TERMS

Canadian Fisheries Waters	"All waters in the fishing zones of Canada, all waters in the territorial sea of Canada and all international waters of Canada." (<u>Fisheries Act</u> , sec. 2)
Compensation for Loss	The replacement of natural habitat or the maintenance of fish production by artificial means in circumstances dictated by social and economic conditions and where mitigation techniques are not adequate to maintain productive fish stocks.
Conservation (of habitats)	The management of human use of fish habitats so that they may yield the greatest sustainable benefit to present and future generations.
Development (of habitats)	The creation of fish habitat and the enhancement or other improvement applied to any type of fish habitat so as to create better conditions for production and maintenance of the fisheries resource.
Fish	"includes shellfish, crustaceans, marine animals, and the eggs, spawn, spat and juvenile stages of fish, shellfish, crustaceans and marine animals." (<u>Fisheries Act</u> , sec. 2)

6. Fish Habitat "Spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes." (Fisheries Act, sec. 31.5)
7. Fish Habitat Management Program Those activities, legislative responsibilities, policies and ministerial powers administered by the Department of Fisheries and Oceans for the purpose of conserving, restoring and developing habitat for the fisheries resources.
8. Fisheries Resources Fish stocks or populations that sustain commercial, recreational or native fishing activities of benefit to Canadians.
9. Mitigation Actions taken during the construction and operation of works and undertakings to alleviate adverse effects on fish habitat.
10. No Net Loss A working principle by which the department, through prior assessment, mitigation, compensation and where necessary, prohibition, strives to prevent losses to the productive capacity of habitats supporting Canada's fisheries resources.
11. Protection (of habitats) Prescribing guidelines and conditions, and enforcing laws for the purpose of preventing the alteration, destruction or disruption of fish habitat.
12. Restoration (of habitats) The treatment of fish habitat that has been altered, disrupted or degraded for the purpose of increasing its capability to sustain a productive fisheries resource.

